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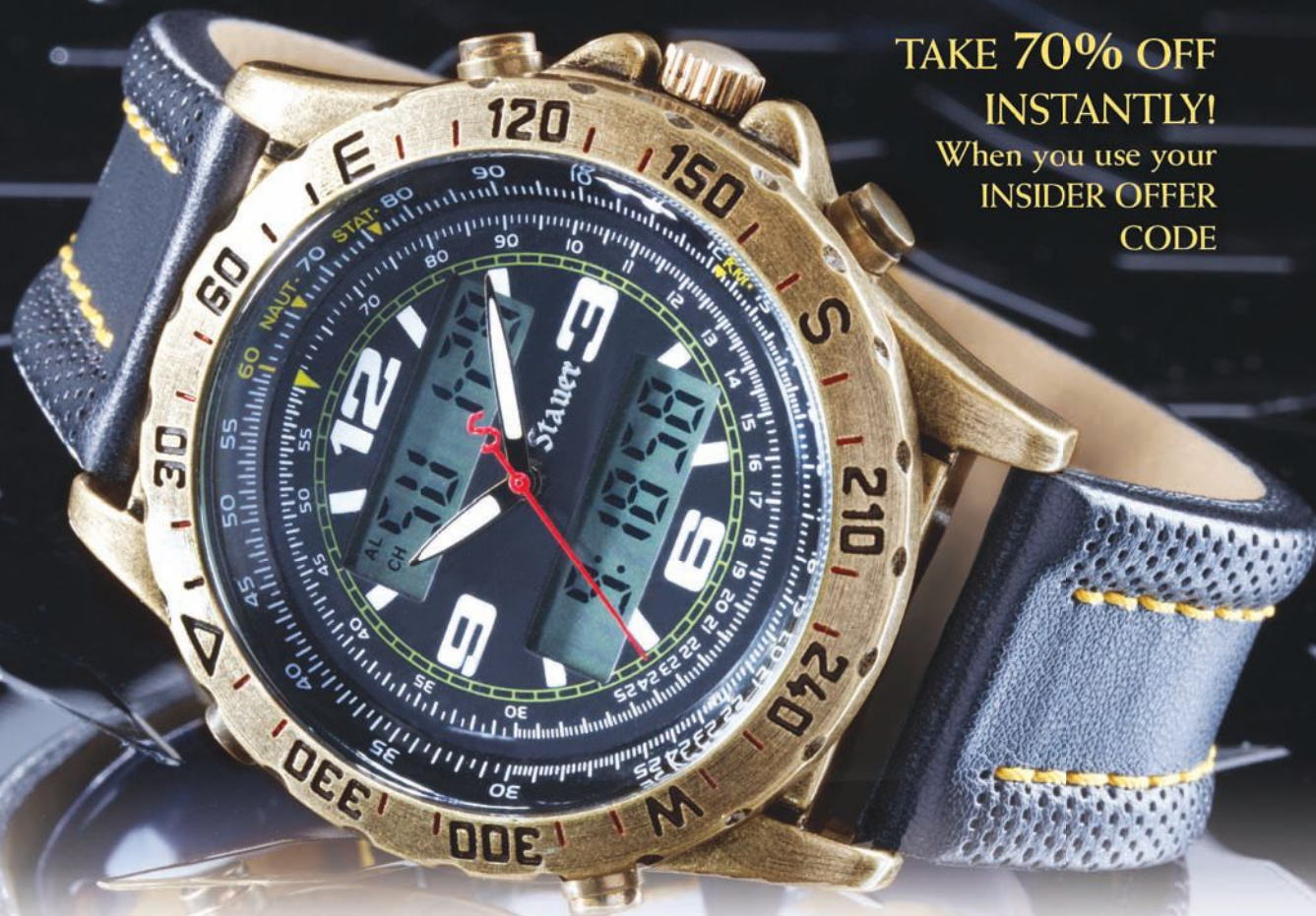
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ON THE COVER: As "in your face" as a photo can be! The F4U-4 saw almost immediate combat in Korea and, with its legendary close air support capabilities, was the Marine grunt's best friend. (Photo by John Dibbs/planepicture.com)

THIS PAGE: A rare and little known variant of the B-24, the USN's PB4Y-2 version replaced the twin tail with the higher single tail. Only one is still flying after a long career as a fire bomber. The operators, 4Y-2 LLC in Casa Grande, Arizona would appreciate any information leading to the discovery of an applicable nose turret and waist blister turrets. (Photo by Scott Germain)

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Barrett Tillman

Props Over Korea

Korea is rightly known as the first jet war, especially for the F-86s and MiG-15s that fought hundreds of engagements around the Yalu River. But in 1950, the world's air forces were still mostly piston-powered, and I've always been intrigued with the transition from prop vs. prop combat to props vs. jets. As this article demonstrates, there was plenty of overlap when the WW II generation of fighters met the future.



Walter Boyne

Life Among the Nukes

As the Cold War built up in the mid-1950s, it was rewarding to know that you were flying the Boeing B-47, easily the most effective instrument of war in the world. It was absolutely thrilling to fly compared to previous piston-engine bombers in SAC. We had a "lead crew" and knew that if war came, SAC's fleet of B-47s would roll the Soviet Union up into a ball of flames in just a few days.



David Truby

Underwater Aircraft Carriers

Old "Sneaky Pete's" plots, plans, and missions have always fascinated me, which is why U.S. Army mavens stuck me in PSYOPS and Counter Intel for much of my enlistment in the early '60s. Add to that my civilian career as a historian, investigator, journalist and author, then learning about the theory turned reality of the Japanese I-400 submarines and their truly scary "What-If" missions ... and there you have it.



Mark Carlson

D-Day to Iwo Jima to Berlin

The moment I heard Gene Elmore's accounts about his combat time in the Navy during and after WW II, I was certain it had to be told. He and the crews of his PB4Y-1 and PB4Y-2 bombers flew in the two biggest invasions of the war, half a world apart. Then he went on to fly R5Ds to Berlin during the Airlift. He had an amazing career. Gene Elmore had been there and done that.



James P. Busha

On a Flying Wing and a Prayer

When I had the extreme honor to interview General Robert L. Cardenas about his WW II and test pilot flying days, I was like a kid and hanging on every word. Especially when he began talking about the Flying Wing. What it must have been like to not only strap yourself into a futuristic-looking airplane, but to wring it out and dance with the devil on those early test flights.



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Underwater Aircraft Carriers and Other Cool Stuff

BY BUDD DAVISSON

A week and a half ago, we shipped *Flight Journal's* WW II's *Last Dogfights* special issue to the printer. It focuses on the tales of the guys who were right there—some actually in dogfights—when WW II came to a close (go to your local bookstore ... you'll like it). Theoretically, as I'm sitting here typing away, we're supposed to ship the issue you're reading right now this Friday. It is now Tuesday. That's two weeks after the last one. This is my way of saying that while we were putting this issue together we didn't spend a lot of time standing around the water cooler (if we had one, which we don't) schmoozing. In fact, it wasn't until just now, when I looked back over the finished issue, that I realized what a fantastically interesting combination of stories we'd put together.

The truth is that a lot of what goes into *Flight Journal* is selected strictly because we like the articles. We've said it before that we basically build a magazine that we like to read ourselves on the theory that other folks will like it too. This time, I think our selections reflect a sometimes off-center interest in subjects that might be viewed as being on the edge of the bell-shaped curve: subjects that aren't talked about very often. Take underwater aircraft carriers, for instance. No ... really ... we're serious.

The Japanese were determined to continue the "surprise attack" mode started at Pearl Harbor with follow-up attacks on West Coast population centers, closing down the Panama Canal and working their way over to New York City. While this may sound so ambitious as to be impossible, they were serious, designing and building the largest submarines of WW II. Actually, no sub was any bigger until the nuclear missile subs of the 1960s. More importantly, they had watertight hangars on deck that carried a number of single-engine bombers. David Truby takes us through the development of the I-400 subs, their Sei-

ran bombers and their fate at the end of the war.

Going in a totally different direction, General Robert Cardenas, USAF (Ret.) speaks through James P. Busha as he tells some hair-raising stories about flight testing the Northrop Flying Wings of the late 1940s. They weren't on the leading edge of aerodynamic design, but so far out in front of it that things didn't always work the way they expected.

Walter Boyne, internationally known author and historian, slips back into his blue flight suit and gives us a glimpse of what it was like as a Strategic Air Command pilot flying the B-47 during the Cold War. As beautiful as the Stratojet was, Boyne tells us it could be as dangerous to the crews as it was to our enemies. Better than the pure pilot talk, Walt paints a vivid, and somewhat disturbing, image of the Cold War and what was at stake.

In "D-Day to Iwo Jima to Berlin," author Mark Carlson follows a Consolidated PB4Y (navalized B-24) pilot through his career that took many odd detours—all of them both interesting and seldom discussed. It's an aspect of WW II and beyond that most of us know little about.

To round things out, *FJ* regular Barrett Tillman helps us step over the threshold from the world of propellers to the jet era in "Props Over Korea." Even though both sides had jet forces, the opening months of the so-called "conflict" saw an odd combination of propeller-driven fighters going after one another. Then, as the war developed into a jet-versus-jet arena, the Corsairs, Mustangs, Skyraiders and A-26s still had to earn their keep while constantly checking their six for MiGs. It was an acute period of transition with a lot of interesting stories.

Besides the above, you're going to see photos and aerial situations that are probably new to you. So, here we go again. This is going to be a fun read! Take my word for it. ✚

The P-51 was instrumental in early Korean combat, initially stationed in Japan, then Korea. These Mustangs of the 8th Squadron / 49th Group (pictured in 1947 at Johnson AFB in Japan) are being led by Maj. James Watkins, who notched up 12 kills, all Japanese fighters, while flying the P-38 in WW II. (Photo by David Williams via Warren Thompson)



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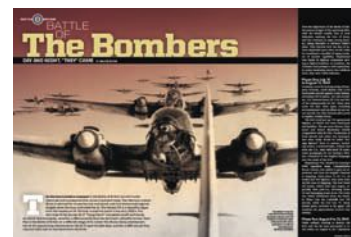


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Battle of Britain: of Tizzy Angles, etc.

Thanks for your superb *Battle of Britain* issue. With countless books, biographies of participants, and excellent British aviation museums, new information is hard to come by. To your authors' great credit, the August *Flight Journal* succeeds beginning with Barrett Tillman's highly informative article detailing the challenge and solution to Fighter Command organization. While most are aware of radar advances, of radio communications, and how information was networked from multiple sources when Luftwaffe flights passed over the coast, Tizzy Angles and early efforts of IFF all add depth to this historic event. Better yet, first person articles such as the final flight of Flying Officer Percy Burton are a great testimony to the heroism of participants.

All but one of the aircraft named reside in the Battle of Britain Hall at RAF Hendon. As a many-time visitor, beginning before the "temporary" hall opened as a 50th anniversary tribute, it's quite ironic that aircraft flown by brave men fighting in the skies above have now spent more than tenfold their time as mortal enemies sleeping peacefully side-by-side on the ground.

Thanks for a terrific issue,

John Mitchell

San Juan Capistrano, California

Thanks, John. The BoB is a subject that never fails to capture our interest, too. BD

He Liked it

I can't put down the *Battle of Britain* issue. This issue is by every measure the best you have ever produced! The facts and insights are beyond anything I have seen in print before. Superior!

Hank Testa

Tucson, AZ

Geez, Hank. That made our week. BD

Guns and Bigger Guns

When discussing how lethal the early Spit and Hurricanes were in dogfights, information on how effective the rifle caliber Brit .303 armament is interesting. British machine guns fired a Brit .303 cal. 180 grain bullet at 2540 fps muzzle velocity with 2120 ft. lb. of energy at 100 yards against the 109s' 20 and 30mm cannon. It was like going to a gunfight with a pop gun. The U.S. fighters had six or eight Browning .50 cal. MGs in their wings with

700 grain bullet, 3000 fps & 9934 ft. lb. energy at 100 yards. It was the right stuff and made a difference.

George Gould
Galveston Texas

Well, you know Americans: bigger is always better. BD

Likes Fighter Comparisons

Thank you for your wonderful *Battle of Britain* anniversary issue. It summarized very succinctly one of history's great air battles. As a former fighter pilot, I was particularly interested in the comparison of fighter capabilities. The accounts of Geisshardt and Wellum are fascinating, and telling: in the instance of two relatively evenly matched aircraft engaging in combat, the most aggressively piloted machine will almost always emerge the winner.

Joe Gano

President, Warbirds of Delaware

In combat, skill almost always wins out, but don't forget the role of luck. BD

Stukas vs. Tanks

Great article on German light and medium bombers in WW II. I'm afraid that the author of the piece is laboring under the same misconception, under which I and many others have, that Ju 87 Stukas, in general, and those piloted by Hans-Ulrich Rudel, in particular, destroyed tanks by bombing them. Until I got around to reading Rudel's autobiography, that is what I thought for several decades. His book has pictures of Stukas fitted with 37mm AA guns, probably exact copies of the gun designed by the genius John Moses Browningfitted with barrels about 10 feet long. These were mounted in the nacelles, which partially covered the wheels, in the fixed landing gear. These guns had the same destructive power on tanks that modern-day 30mm cannons loaded with DU shells, display on armored vehicles. *Flight Journal* is the best magazine, of any type, that I have ever read. Keep up the great work.

Richard Gearon

We're familiar with the tank-busting Stukas. They were the A-10s of their era. BD

Mention the Poles

Years ago I sent an email requesting that you do a cover article on the Battle of Britain and the role of the Polish pilots (126 of them who flew the Hurricanes and the Spits, especially in September and October of 1940), and here it is. However, not one word in the entire issue mentioned those pilots from Poland. With my long and barely pronounceable Polish name, it's obvious which way I lean when it comes to this topic.

Yet, let not the bias cloud the contribution of the Poles. The 303 squadron distinguished itself and led the way to several other Polish squadrons, which entered the fray during those dark days in August, September and October of 1940. Their experience battling the Germans in Poland with planes that were fit for WW I led the way toward new approaches in flying formations. Their courage and experience assisted the Brits in the air when Britain's reserves were almost extinguished.

At first, reluctantly, these Poles were allowed to fly in September of 1940 led by the 303 squadron. During Sept. and Oct of that year, however, they and the other newly formed Polish squadrons accounted for 15 to 48 percent of downed German aircraft on certain days of those two months. Even Dowding declared that, "Had it not been for the magnificent material contributed by the Polish squadrons and their unsurpassed gallantry, I hesitate to say that the outcome of battle would have been the same."

The Poles represented the largest group of foreign pilots during the Battle of Britain and they also took the greatest losses among all foreign pilots during that event. I think the problem in not giving these brave men the place they deserve in history is simple; they have unpronounceable names and their names are impossible to spell, thus easily dismissed in favor of Percy Burton, Alan Deere, Sailor Malan, Johnny Kent, Peter Townsend, need I go on?

How about writing a one-page bit on these forgotten countrymen of mine? I have a rare attachment to them. While they were risking their lives over the skies of southern England, I was a newborn living just 30 miles north of Warsaw and learned to love and admire them years later, and today even admire them more.

Alex Dobrowolski



Alex, you're absolutely right in everything you say, except there was no bias. We simply didn't have the room. The BoB is a wide, complex subject. At some point in the future we'll do a special Polish article you mentioned. BD

A group of pilots of No. 303 Polish Fighter Squadron RAF walking toward the camera from a Hawker Hurricane after, purportedly, returning from a fighter sortie.

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Strange Mustang!

Each time we produce an issue of *Flight Journal*, we go through literally hundreds and hundreds of photos, but only about one out of 20 ends up gracing one of the pages. One of those, a Korean era F-82B Twin Mustang is available as a downloadable PDF on FlightJournal.com. The F-82 Twin Mustang, while appearing a little odd, is actually a good airplane for the purpose. Having two pilots on board and the extra fuel in the center section allowed it to fly long duration missions as a night fighter. It missed WW II but made up for it by scoring the first aerial victory in Korea. Enjoy! (Photo courtesy of Stan Piet)





Clockwise from top left: A collage of the piston aircraft engaged in combat over Korea: USN/USMC Vought Corsair; USAF North American F-82; Polikarpov Po-2; and Yak-9. (Photo by John Dibbs/planepicture.com; Photo courtesy of Stan Piet; Photo by Lisa Eckhardt; Photo by John Dibbs/planepicture.com)



PROPS OVER KOREA

WW II AERO-TECH MEETS THE JET AGE

BY BARRETT TILLMAN

Most wars are come-as-you-are affairs with little time for the recipients to prepare for uninvited visitors. That was the situation on the Korean peninsula in June 1950 when the Communist North blitzed across the 38th Parallel seeking “reunification” with the South.

Five years after VJ-Day, the U.S. armed forces were badly atrophied. The inevitable “peace dividend” sought after every war had reduced America’s military to a pale shade of its 1945 glory, and that applied to the U.S. Air Force. When Pyongyang despot Kim Il Sung launched his assault, the U.S. Far East Air Forces counted five fighter wings and a medium bomb wing, plus reconnaissance and transport units. On June 25th, most were based in Japan and Okinawa, though some augmented the Republic of Korea’s (ROK) small air force.

The North Koreans fielded about 150 Soviet-built piston-powered aircraft, mainly Lavochkin and Yak fighters with Ilyushin Il-10 Sturmoviks. They could not compete with the Americans in quality or numbers, but they tried. The result was a series of combats pitting formerly friendly WW II aircraft against each other.

Shooting to Kill

Two days after the Communist invasion, Yaks clashed with unlikely opponents: North American F-82s. Intended for long-range bomber escort, the Twin Mustang featured two fuselages mated by connecting wing and horizontal stabilizers, originally with cockpits for two pilots. However, the F-82G was produced as a night fighter with one cockpit for the radar operator.

On June 27th, Twin Mustangs from two squadrons were deployed to cover the evacuation of Kimpo and Suwon, resulting in the war's first air combat. When seven Communist fighters appeared, five F-82s were on hand. Major James Little led the engagement, followed by Lt. William G. Hudson with Lt. Carl Fraser as his observer. In a short combat, the seemingly ungainly Twin Mustangs handily bested the Koreans. Hudson wrapped into a hard turn onto a Yak-11's tail and followed it to the right. His second burst set the Yak afire and the pilot bailed out while the back-seater went down with the plane. "Skeeter" Hudson was credited with the first victory of the war.

When the smoke cleared, the F-82s had downed a Yak and two Lavochkins—plus two probably destroyed.

That afternoon, the F-80 Shooting Stars bagged four Il-10 Sturmoviks. As the official USAF history noted, "When the Red pilots who survived got back ... they evidently passed the word that the Fifth Air Force was shooting to kill. No more aggressor planes appeared in the Seoul area on June 27th."

Twin Mustangs scored no further victories but the pattern was set: in the world's first jet war, piston-powered aircraft remained major players until the end.

Six days later, *USS Valley Forge* F9F Panther pilots gunned two Yak-9s on the Navy's first jet combat mission. But carrier aviators flew far more piston aircraft than jets. On September 4th, in international waters southeast of Port Arthur, Russia, a flight of *USS Valley Forge* Corsairs was vectored onto a flight of unidentified aircraft. The bogeys split with one continuing inbound, and the F4Us found a twin-engine aircraft tentatively identified as an Ilyushin Il-4, an antiquated twin-engine bomber, that opened fire. The Corsair leader missed, but Ensign Edward Laney did not. One Russian body was recovered; the intruder most likely was a Douglas A-20 from America's WW II lend-lease program.

The second XP-82 NA seen here at the Hawthorne plant in 1945 was built with the Packard-built V-1650 Merlin and was originally intended as a long-range escort fighter for the Pacific Theatre. (Photo courtesy of Stan Plet)



**PISTON-POWERED AIRCRAFT REMAINED
MAJOR PLAYERS UNTIL THE END**



Russia's post WW II Lavochkin La-11 was a 400mph fighter flown by Communist forces over Korea. (Photo by John Dibbs/planepicture.com)

The Piston War

Most Allied fighters in-theater were F-51D Mustangs, including those flown by No. 77 Squadron Royal Australian Air Force. On June 29th, the U.S. 80th Fighter-Bomber Squadron (FBS) tangled with Il-10s and La-7s, producing multiple kills. Second Lt. Orrin Fox downed two Ilyshins near Suwon while two other Mustang pilots also scored.

However, the Communists fought back. On July 12th, three Yaks scored a notable success in downing a 19th Bomb Group B-29 near Seoul. A week later, the Yaks shot up another Superfortress but it survived.

That summer NKAf Yaks also harassed ROK aircraft, claiming two L-5 observation planes.

Nor was that all. In mid-July, four Yaks attacked Taejon, encountering four Shooting Stars. In a brief combat, the F-80s downed three attackers,

but the survivor out-turned one of the jets and scored lethal hits. The 36th Fighter Squadron jet crashed when the pilot tried a forced landing.

Then in late September, another Yak defeated a 39th FS Mustang, also with the pilot's loss.

By November, the Mustang stable included South Africa's No. 2 Squadron, attached to the U.S. 18th Fighter Wing. In the first six days that month, the 18th notched six victories.

Then the MiGs arrived.

Advent of the MiGs

On November 1st, the swept-wing Soviet jets announced their presence by shooting down a 39th Squadron Mustang. Thereafter, the MiGs were increasingly active, intercepting United Nations aircraft as often as five times a day. Until F-86 Sabres could arrive, the "slow movers" were on their own.

Much overlooked during the Korean War, F-51 Mustangs were operated by Commonwealth forces including South African 2 Squadron and the Royal Australian Air Force's 77 Squadron, all in cooperation with the USAF's 18th Fighter Bomber Wing. After two years most were replaced by jet aircraft after heavy losses to ground fire that decimated their ranks. (Photo courtesy of Stan Piet)

IN THE FIRST SIX DAYS THAT MONTH, THE 18TH NOTCHED SIX VICTORIES ... THEN THE MIGS ARRIVED



A remarkable encounter occurred on November 7th when the 12th FBS clashed with four jets near the Yalu. Leading the flight was the squadron CO, outspoken Maj. Kendall Carlson, who did not shy from the jets' initial head-on attack. Using their greater energy, the Reds initiated a "yo-yo" attack, alternately going vertical and diving on the Mustangs. Timing his turns well, Carlson and his wingman broke into the MiGs at the bottom of their run. Carlson scored good hits on a jet's wingroot and would have put more .50 caliber into it, but another MiG intervened. The first jet disappeared, leaving the other three to depart.

Regrouping, Carlson's flight saw a burning aircraft on the ground. Headquarters denied him a victory on the paper-thin basis that nobody had seen the impact, but it's likely that Kendall Carlson downed the first MiG of the Korean War. (The first MiG credited to a U.S. jet was engaged

MUSTANGS VS. MIGS

The late Lt. Col. Duane "Bud" Biteman of the 18th Fighter-Bomber Wing described Mustang tactics against MiGs.

"Although our propeller-driven F-51 Mustangs were no match for the fast jets in air-to-air battles, we knew from the simulated 'dogfights' between our F-80 jets and the Mustangs, that the '51 could survive a jet confrontation ... but only if strict, disciplined defensive tactics were applied, with very precise timing of each defensive maneuver.

"For example: the great speed advantage of the jets could be somewhat offset by the much tighter turning radius of the Mustang. So, when attacked by jets, the '51 pilot would have to keep a close eye on the attacking enemy fighter and make an abrupt, tight turn into the attacker at just the precise moment before the jet came into firing range. In that way, the Mustang would have equal opportunity to fire at the jet in a head-on pass ... trading gun for gun, and for the moment, eliminating the enemy's advantage of speed.

"Then, when the jet sped past, swinging wide because of his excess momentum, the '51 pilot would have to immediately dive into a very, very tight descending spiral ... racing to get down close to the ground as quickly as possible. If the jet set up for another attack before the Mustang could get down to the deck, among the mountains, it might be necessary to synchronize yet more head-on passes to keep the jet from making clean, deadly stern attacks.

"Finally, when the Mustang was able to get down into the mountain valleys, he could try to "scrape off" the high-speed, wider-turning jet in the narrow canyons ... still pulling up to meet each attack head-on, trading gun for gun, until ultimately the jet must run low on fuel and return to base, leaving the '51 pilot with plenty of remaining fuel to high-tail it for home ... badly shaken, but still safe and still flying!"

Thanks to Lt. Col. Duane E. Biteman and Hal Barker of the Korean War Project.



with two F-80 squadrons on November 8th, but Soviet records showed that the "victim" returned damaged. The first actual jet versus jet kill was scored by a Grumman F9F Panther off USS *Valley Forge* the next day.)

Mustang squadrons recognized the prospects of engaging enemy jets and tried to train accordingly. F-51s sparred with F-80 Shooting Stars, confirming the relative advantages and disadvantages of each type.

Piston fighters could survive against MiGs by obvious methods: staying low and timing their turns to foil the jets' gunnery passes. Especially when MiGs operated well south of the Yalu, at lower altitudes they risked running low on fuel pursuing their intended victims. Prop planes also benefited from their ability to maneuver in rough terrain, making themselves more difficult to see while forcing the jets to risk flying into ridgelines. The F-51's last victory was scored June 20th, 1951, almost exactly a year after the invasion. A flight of 18th Wing Mustangs engaged six Yak-9s, and Lt. J.G. Harrison tracked one in his gyro gunsight. His postmortem: "Them Yaks are flown by a bunch of yaks and there ain't no sweat."

Another prop victory came four nights later when a B-26 Invader of the 8th Light Bomb Squadron gunned a Po-2.

Finally, a South African Mustang pilot damaged a MiG in March of 1952.



A VMF-323 "Death Rattlers" pilot poses with a squadron F4U-4B Corsair and its associated weaponry at airfield K-1, Pusan, S. Korea during February 1951. (Photo courtesy of Jack Cook)

Flying Leathernecks

On April 21st, 1951, Marine Corsairs first clashed with Yaks. Launched off the light carrier *USS Bataan* in the Yellow Sea, Capt. Philip DeLong of VMF-312 led a four-plane armed reconnaissance along the coast. Flying F4Us in his second war, DeLong was experienced, lethal, and had been a double ace against the Japanese.

Flying along the coast, the division split with DeLong heading north with First Lt. Harold Daigh. They met in-line engine fighters tentatively identified as Mustangs ... then one of the strangers opened fire. DeLong's Corsair was hit, and he split-essed to evade.

Daigh shot the wing off one Yak, then chased another. DeLong called for a defensive weave that worked as Cdr. Jimmy Thatch intended a decade before. In the dogfight, DeLong downed two Yak-

9s and Daigh hit the other. They were the first Marine Corps victories of the Korean War.

Marine night fighters got their first chance in the summer of 1951. VMF(N)-513 flew F4U-5Ns and F7F-3N Tigercats, scoring kills in both. On the night of June 30th/July 1st, an F7F was airborne near Seoul when the controlling GCI station got a contact. Capt. E.B. Long with Warrant Officer R.C. Buckingham took their Tigercat northward and gained visual contact on a Po-2. But as Long recounted, the slow, highly maneuverable biplane, painted black, made an extremely difficult target. "It took three passes for me to get him lined up," Long wrote. "But when I did, the tremendous firepower of the Tigercat did the job quickly, and he went down into the side of a mountain in a fiery crash."

Another 513 Corsair pilot, Capt. Donald Eaton, downed a Po-2 the next month, and a Tigercat crew added another in September. Subsequently, the "Flying Nightmares" transitioned to the Douglas F3D-2 Skyknight, a dedicated jet night fighter, and added six more victories to the four F4U-F7F kills.

1952: The Naval War

MiG engagements increased in the summer and fall of 1952, involving more naval aircraft. On August 9th, Lt. Peter Carmichael led four Hawker Sea Furies off the British carrier *HMS Ocean*, attacking targets near Pyongyang. Carmichael was an experienced aviator, having flown Seafires and Corsairs in WW II. Eight MiGs jumped the Britons from out of the sun but Carmichael's sharp-eyed wingman, Sub. Lt. Carl Haines, spotted them and called the threat. The junior pilot, Sub. Lt. Brian

The 6147th Tactical Air Control Group operated T-6Ds as forward air control spotter aircraft or Mosquito missions during the first two years of the Korean Conflict. (Photo courtesy of Stan Piet)





**FOLMAR'S FOUR 20MM CANNON
SCORED DECISIVE HITS. STREAMING
BLACK SMOKE, THE MIG NOSED DOWN
AND THE PILOT EJECTED AT 7,000 FEET.**

Ellis, responded to tracers snapping by his canopy and wracked into an evasive turn.

From then on, the MiGs ganged both sections, four jets on each pair of Sea Furies. However, as "Hoagy" Carmichael noted, "By continuing to turn we presented impossible targets. They made no attempt to bracket us."

A single MiG bored in on Carmichael head-on, the jet and prop briefly exchanging fire. Carmichael thought that he and Haines got hits, then the MiG flashed toward the second section. Peter Davies and "Smoo" Ellis also scored, as the Chinese broke off emitting smoke.

The MiG was credited as destroyed, though some sources mention a second possible victim.

For obscure reasons, Carmichael received full credit for the victory, though he cited his three wingmen as contributing to the red's demise.

MiGs forced a Sea Fury to crash-land after a separate combat, leaving the contest tied at one to one.

The next month, U.S. Marine Corsairs off the escort carrier *USS Sicily* in the Yellow Sea reported increasingly aggressive MiGs. The enemy jets favored bracketing tactics, trying to trap the recip. between MiG sections or flights, but usually the leathernecks were able to evade.

Not always, though. On September 10th, Capt. Jesse Folmar and First Lt. Willie Daniels of VMA-312 approached the coast at 10,000 feet

Marine Captain Jesse Folmar shot down a MiG-15 moments before bailing out of his badly crippled Corsair. (Photo by Paul Bowen)

on an interdiction mission. Folmar spotted two MiGs approaching, called "Tally ho, bandits!" and jettisoned his external load. The F4Us began weaving as the jets pressed their runs from around the clock, both sides firing snap shots.

One Chinese pilot misjudged his reverse, turning left while Folmar banked right. Folmar reported, "I pulled up, gave him about a 20-mile lead, and held a five-second burst. I could tell I had him bore-sighted by the blinking flashes along the left side of the fuselage."

Folmar's four 20mm cannon scored decisive hits. Streaming black smoke, the MiG nosed down and the pilot ejected at 7,000 feet.

Then, four more MiGs arrived, capping the fight as three continued attacking. Daniels hosed off several bursts of .50 caliber, but the Communists were persistent. As Folmar weaved in a descent, he took cannon hits in his port wing. A 37mm round took off the aileron and four feet of the tip. Struggling to retain control, Folmar forced another MiG into an overshoot but realized he could do no more. He transmitted a Mayday, released his straps, and went over the side.

The 33-year-old Marine heard "an earsplitting crack" as the MiG screeched close aboard, shooting at the spinning Corsair. The Reds might have killed Folmar in his chute or in the water, but American anti-aircraft gunners on nearby Sok-to Island forced them off.

The fight had lasted an eternal eight minutes, but Jesse Folmar had downed the last MiG credited to a piston aircraft in the Korean War.

However, MiG engagements continued, and during October the enemy jets downed two Navy Corsairs off *USS Kearsarge* and *Princeton*. Both aviators were killed.

The last known instance of MiGs claiming a piston kill came in early May 1953 when Lt. L.R. Richey off the *Princeton* was killed. However, the Navy reported him downed by AA fire with no reference to MiGs.

1953: The Night War

The usual suspect for UN nightstalkers was Polikarpov's long-lived Po-2 two-seat biplane. Dating from 1927 and built in enormous numbers, it was best known for its WW II use by Russian female aircrews as the famous "night witches" of the Eastern Front from 1942-45. North Korean fliers made a nuisance of themselves, sometimes inflicting damage on Allied bases and even destroying some aircraft.

Thus, the "Bedcheck Charlies" drew a lopsided response.

F-82s, which had scored the first USAF kills of the war, were withdrawn in late 1951. Therefore, nocturnal interception became the province of Navy and Marine prop fighters.

In early 1953, Air Force Lockheed F-94s of the 319th Fighter Interceptor Squadron had a hard time dealing with 80-knot targets, and though the Starfires claimed four kills, including two jets, three F-94s were lost from midair collisions or flying into the ground. It was a disproportionate expense: risking a \$200,000 jet to chase down a fabric-covered biplane.

That summer, the "Bedcheck Charlies" grew more aggressive. In June, two Corsair night fighter detachments went ashore, "op-conned" to Fifth Air Force. One pair of F4U-5Ns came from *USS Valley Forge*, the other from *Princeton*. The latter included Lt. Guy Bordelon and Lt. Ralph Hopson. In barely two weeks, "Lucky Pierre" Bordelon had

Built in enormous numbers from 1928, Polikarpov's Po-2 trainer was employed as a night bomber in Korea to harass Allied troops. It was therefore a frequent victim of U.S. night fighters. (Photo by Lisa Eckhardt)

THE PO-2 TWO-SEAT BIPLANE WAS ... BEST KNOWN FOR ITS WW II USE BY RUSSIAN FEMALE AIRCREWS AS THE FAMOUS "NIGHT WITCHES" OF THE EASTERN FRONT



VICTORIES BY PROPELLER AIRCRAFT IN KOREA

Allied Aircraft	Victories	Known losses
North American F-51	14	8+
Vought F4U	11	4?
North American F-82	3	-
Grumman F7F	2	-
Douglas AD	1	-
Douglas B-26	1	?
Hawker Sea Fury	1	1
Totals	33	15+

TOP SCORES BY PISTON PILOTS IN KOREAN WAR

Lt. Guy P. Bordelon	USN	VC-3	F4U	5
Second Lt. Orrin Fox	USAF	80 FBS	F-51	2
Capt. A.R. Flake	USAF	67 FBS	F-51	1.5
Capt. H.I. Price	USAF	67 FBS	F-51	1.5

four engagements, claiming kills in three.

On June 29th, Bordelon scrambled in response to a radar contact from the Marine controller at Pyongtaek. The tailhooker closed the range, visually identifying the intruder as hostile. The Yak-18's observer opened fire but his machine-gun armament was no match for the Corsair's four 20 millimeters.

Thirty minutes later, GCI had another bogey and again the gunner spotted the threat, firing at the Corsair. Bordelon reported that his victim came apart, falling in flames just before midnight. At 2130 on July 1st, Bordelon was directed onto two Lavochkins. He closed on the bandits from six o'clock low and engaged the trailing Red with two bursts. With the leader distracted, Bordelon closed on him "to point-blank range and immediately opened fire." The Communist leader tried to evade by turning and climbing but took a cluster of armor-piercing incendiary hits.

Finally, on July 17th, Bordelon claimed an La-9 north of Seoul. That night, a navy visitor in the joint operations center was Vice Adm. J.J. Clark, commander of the Seventh Fleet. Upon hearing the report, without awaiting confirmation, he declared, "The first night fighter ace gets a Navy Cross."

Guy Bordelon was recognized as the U.S. Navy's only Korean War ace and its last piston-powered ace. Yet many aviators were skeptical of the actual results: in three years no night fighter had claimed a double, but Bordelon did it twice in three nights. Additionally, he was the only one of the four detached Corsair pilots to score. Much later, Capt. Jerry O'Rourke, leader of F3D Skyknights escorting nocturnal B-29s, summarized, "Each of the five kills had occurred in remote areas, inaccessible to easy searching. Some questioned whether the claims were legitimate, while others pointed out that any wreckage would have been picked over



by scavenging South Koreans who would fear reprisal and never reveal the whereabouts of any remaining clues."

Meanwhile, Marine Composite Squadron One was heard from. Mainly it flew airborne early warning missions in its AD-4Ns out of Kimpo but on the night of June 16th, Maj. George Linnemeier and CWO Vern Kramer stalked and killed a Po-2. Another VMC-1 crew claimed a "possible."

Summing Up

A definitive tally of props versus jets is almost impossible to compile due to conflicting information and uncertainty as to cause of loss in some cases. However, F-51s claimed four MiGs probably destroyed and a dozen or more damaged. Mustangs were credited with 14 kills against all Communist aircraft versus about eight known losses.

Corsairs claimed 11 victories—mostly by night fighters—against at least four air-to-air losses.

Marine Tigercats downed at least two night fliers without known loss to enemy aircraft. ✚

Visit Barrett Tillman at btillman.com.

Mainly flown by Navy carrier squadrons, the Douglas AD Skyraider series also equipped Marine Composite Squadron One, which claimed a Po-2 in 1953. (Photo by Paul Bowen)

SPRING, 1944. My head wound had healed but my back was still killing me when I jumped off the train in occupied France. I had recently escaped from neutral Switzerland after being blown out of my B-24 Liberator while making my 20th bomb run into Germany. Although I landed on the German side of the lines, I was able to swim to the Swiss side of the border where I was interned for a short time before making a run for it. Technically speaking, I wasn't supposed to be in Europe at all. I'd made my way to England in 1943 under false pretenses by ferrying a Douglas C-54 Skymaster from the United States. I had orders to return to Wright Field where I was a flight evaluation test pilot, but I got sidetracked and conned my way into the 44th Bomb Group as a pilot. That's what I was doing when my luck ran out.

Back Home Things Had Changed

I became a guest of the French underground and slugged it out with the Germans on the ground until D-Day. Then all hell broke loose, and a month later I was on my way back home to Ohio via England aboard a C-47. When I rejoined the Flight Test Division at Wright Field, a lot had changed since I'd left. One of the most notable was the fact that propeller driven aircraft were not the fastest thing in the skies anymore, as the jets began to take over.

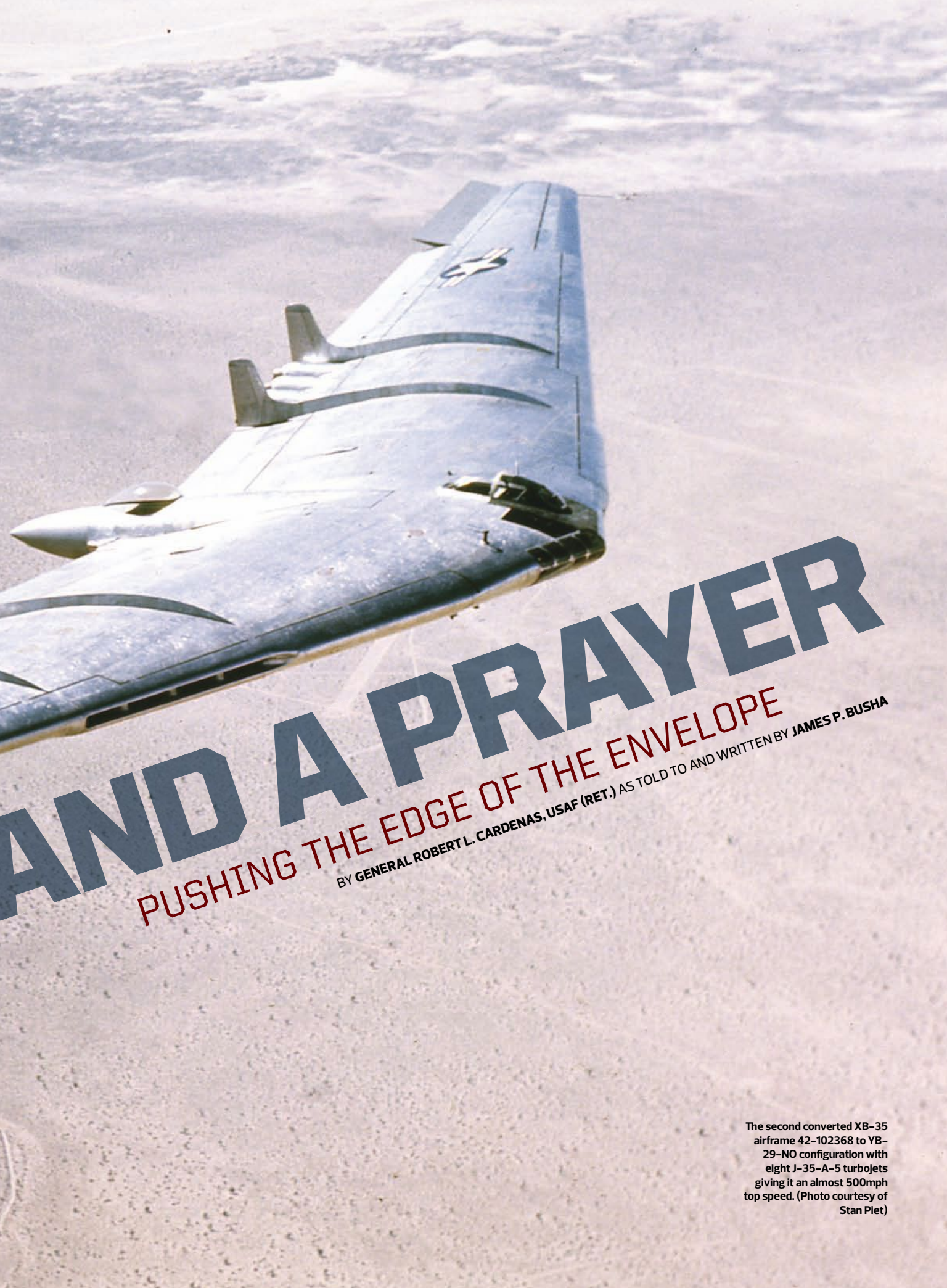
Actually, my first encounter with a jet was somewhere high over Germany as I was returning to England from another bombing mission. An Me 262 came sneaking up behind me so damn fast that I thought I had stalled the Liberator out! That was the first time I'd witnessed the new propulsion system and realized that our vast and superior air armada was obsolete. I had the pleasure of flying and evaluating some of the captured Luftwaffe jets over the skies of Ohio that included the Me 262 and the Arado 234, and I quickly joined the ranks of many others who sure were glad the Germans didn't have these at the beginning of the war! But that wasn't the only thing that that concerned the U.S. military and the Prime Minister of England when war broke out.

A Radical New Concept is Launched

There had been a meeting between the United States assistant Secretary of War, the leading generals, and Winston Churchill discussing firm evidence that Hitler was going to invade England. That was of great concern because if the Germans invaded, there would be no air bases in which to continue to fight the war. That night a requirement was born to build an airplane that could fly 10,000 miles and carry 10,000 pounds of bombs. And through that vision was created two very large propeller driven bombers: the XB-35 Flying Wing and the XB-36 Peacemaker. Because of their size and the jet engines on many other new aircraft being developed at that time, a



**ON A
FLYING WING**



AND A PRAYER

PUSHING THE EDGE OF THE ENVELOPE

BY GENERAL ROBERT L. CARDENAS, USAF (RET.) AS TOLD TO AND WRITTEN BY JAMES P. BUSHA

The second converted XB-35 airframe 42-102368 to YB-29-NO configuration with eight J-35-A-5 turbojets giving it an almost 500mph top speed. (Photo courtesy of Stan Piet)

requirement for longer runways and less populated areas to test them were deemed not only safe, but necessary.

My boss, Col. Albert “Bullet” Boyd, head of flight test division, started sending teams out to the barren California wasteland known as Muroc in the summer of 1946. Glenn Edwards, Danny Forbes and I were one of the first batches sent, and we were called “Los Tres Amigos” which means three friends. We also had a civilian flight test engineer named Richard Smith. Glenn had the Convair XB-46 and I, as chief test pilot of the bomber division, had the North American XB-45 to evaluate. Both Glenn and I shared Danny as copilot, so we had the fun of flying and Dick Smith had all the work of reducing our data into readable form.

Introduction to Flying Wings

We were fooling around with a lot of other things out in the desert during that time, including the small twin-engine pusher Flying Wing called the Northrop N9MA. It was in preparation for my later test work in the XB-49 Flying Wing. I had to wait for Northrop to convert an XB-35 into all jet engines first, and then for the company to finish Phase I research before I took over.

I thought the little Wing was a “cute” airplane, but you had to be very careful on takeoff. I sat way up front on top of the Wing, so when I took off and the Wing tilted upward, even two degrees, it felt like I was going over backwards. I immediately shoved the stick forward and the nosewheel

General Cardenes stands by a war prize Arado 234 that he flew while stationed at Wright Field after WW II. (Photo courtesy of James P. Busha)



The wing had no tail, so when I kicked the rudder pedal it activated a split flap out on the wingtip that created drag. The drag at the end of the wing then turned me about the wingtip.



The Northrop X/YB-35 program was beset with numerous technical problems that saw its production cancellation as early as 1944, but engineering development continued to aid in the jet-engine post-war YB-49 series. (Photo courtesy of Stan Piet)

hit the ground—I felt like a jackrabbit bouncing down the runway. Another feature I had to get used to was the Wing had no tail, so the rudder pedals were used differently. I could shove both pedals in at the same time with no noticeable change in my flight. But, when I kicked the right rudder or left pedal separately, it activated a split flap out on the wingtip that created drag. The drag at the end of the wing then turned me about the wingtip. I didn't know the difference after flying it for a while and just got used to it.

In 1947, as I waited for the XB-49, we shifted gears and took aim at the “brick wall” known as the sound barrier. Col. Boyd selected me as operations officer and command pilot of the B-29 that dropped Chuck Yeager. He'd been strapped in the Bell X-1 as he punched through the sound barrier. The scientists assigned to the project included members from MIT, Caltech, and NACA (forerunner of NASA) and they thought we were moving way too fast. NACA even called us “a bunch of cowboys.” In a way I guess we were, but we were test pilots and damn good ones to boot! The X-1 program was a success, but it didn't last too long, so by the end of 1947 I was beginning my next project: the Northrop XB-49 Flying Wing.



Enter the Jet Wings: They Were Different Birds!

I was supposed to have flown the prop version of the Wing called the XB-35, but I was too busy with the X-1 project. Besides, I had told Col. Boyd that any engineer who put a propeller out on the trailing edge of a wing did not deserve to keep his diploma! The air coming over the top of the wing is a different temperature, velocity, and dynamic pressure than that coming under the bottom. Those little propeller blades had to cut through two different air masses in micro seconds and that caused flutter—same thing they found on the B-36 Peacemaker. I told Col. Boyd I would not fly the XB-35 unless they put jets in it. They did, and I did, as I began Phase II testing at Muroc.

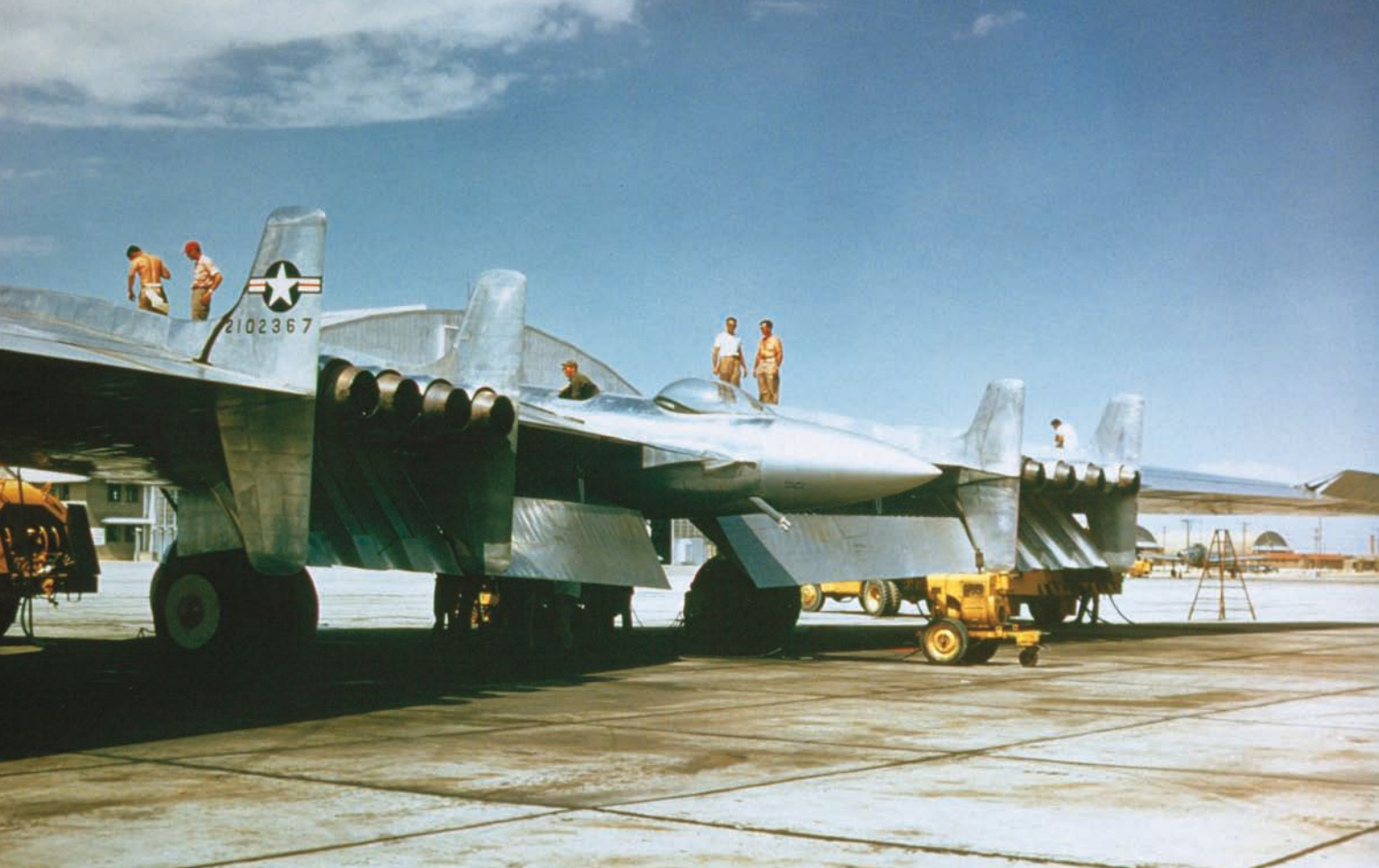
Northrop supplied us with two of the all-jet Flying Wings. YB-49 no. 42-102367 was instrumented for stability and control while YB-49 no. 42-102368 was built for performance flight tests. I was checked out in no. 367 by Northrop test pilot Mr. Max Stanley, a really good pilot and all around nice guy. Checking out a new pilot in the XB-49 was no easy task. The pilot sat up high with his head looking out of a bubble while



the copilot seat was buried in front, below where the pilot sat. Max gave me his blessings and in early 1948 my crew—copilot Danny Forbes and flight engineer Sgt. Cunningham—took delivery of no. 368 and flew it from the Northrop factory at Hawthorne to Muroc (70 miles) in 20 minutes to begin military performance flight tests.

My early tests consisted of finding out what was the best takeoff speed, climb speed, stall speeds, opening of bomb bay door speeds, and landing speeds. Every one of the tests had their own set of problems. Some were minor in nature,

While waiting for the XB-49 Wing to be completed, Cardenas became the operations officer of the team that broke the sound barrier and was command pilot on the B-29 that dropped Yeager in the Bell X-1A.



Nice rear look at the massive flap and flaperon control systems of the innovative Flying Wing design. (Photo courtesy of Stan Piet)

while others almost killed me! For example, on my first takeoff in the XB-49, the gear doors blew off because the Wing accelerated too rapidly. To prevent that I could either pull the Wing up on takeoff at a high angle of attack, or pull back on the power and wait the minute and a half for the gear to retract. I knew of no pilot who liked to do either one of those on takeoff! The problem was that the entire aircraft was designed and created around the XB-35, which of course was powered by propellers and operated at slower speeds. The only thing Northrop did was to swap prop engines for jets, and of course the speed of the Wing increased.

I knew in a stall I wouldn't get a big shudder because most of the shudder you get in a stall comes from the tail, not your wing.

After takeoff, I would reach my cruising altitude and level off. In level flight I began to rock back and forth in my seat, in unison with the fuel sloshing around behind me, stored in a big rubber bag, buried inside.

Next I tried opening the bomb bay doors, and lo and behold they were sucked right off! But the worst was yet to come as I ran the Wing through a stall test.

A Test Pilot's Nightmare

I consulted Paul Bickle, who was the chief engi-

neer at Wright Field, and he told me I was never going to get a clean stall with this airplane. Paul said the wingtip would stall first because there was not enough sweep. Paul also told me that since my rudders were out on the wingtip, in the split flaps, they also acted as trim tabs. He then told me to trim the entire split flaps either up or down instead of splitting them, and this would give me the trim control I needed. I was to try it his way instead of using the yoke, and hopefully I might get a full wing stall. I not only got the stall, but I also got the ride of my life!

I brought the XB-49 to 20,000 feet and pulled back on the throttles as I waited for the Wing to stop flying. I knew I wouldn't get a big shudder because most of the shudder you get in a stall comes from the tail. As the Wing quit flying, there was no hint of a shudder, and I had no clue what was going to happen next. It gave a lurch, went over backwards, and started tumbling. It was as if you took a nice crisp clean dollar bill out and let it go, watching it spin around its center. The engineers called it a lateral roll and said I had encountered inertial coupling, but the horrible truth was I no longer had any control of the airplane, and that reality hit me right between the eyeballs.

I had no time for prayers and no aerodynamic control. I am alive today because the throttles were not down on the console where they normally are, but were mounted up above my head. There were two handles, one for the four left engines and one for the four right engines, just an

arm's length away. I was able to grab hold of the left throttle and applied full power as four powerful jet engines roared to life and wheeled me over like a cartwheel. I was thrown into an aerodynamic range of a flat spin, and that was one thing I knew how to get out of. I recovered at about 800 feet over the ground at Muroc.

After I landed I wrote a one-page report that stated, "This aircraft is never to be intentionally stalled." I then went to Poncho's Happy Bottom Riding club that night and had a well-deserved drink!

Tragedy Strikes

I continued to fly the Wing and finished most of the performance testing. I was just about to start the Stability and Control phase when I was given the opportunity to finish my aeronautical engineering degree at USC. I pleaded with Col. Boyd to let me go and he reluctantly did, as long as I could find a replacement to finish the tests. Well, that was the easy part because my old friend Glenn Edwards had helped Dr. Perkins write the book on stability and control at Princeton. On May 20th and 21st of 1948, I checked out Glenn in the XB-49 as I gritted my teeth in the copilot seat, helpless and just along for the ride. Glenn, of course, did a fine job, and I left for Dayton to pick up my sweetheart, get married in Las Vegas, and hightail it back to California to start school.

Just 15 days later on June 5th, my good friends Glenn Edwards and Danny Forbes were killed while flying XB-49 no. 368 at Muroc. When it hit the ground it hit upside down so flat that it didn't have much of a transverse motion. The wing areas outboard of the engines were found 15 miles downstream. It was a tragic loss of the entire crew and of friendships that will never be forgotten. Col. Boyd of course called me up and told me to finish the tests in the other airplane.

I flew no. 367 in the fall of 1948 during a series of stability and control tests. The XB-49 in every other respect was beautiful—just like flying a fighter. But the XB-49 was not a bomber and had many deficiencies. Without a doubt the biggest problem was that the Wing was way ahead of its time. This was before the advent of computers, and the sensory and response capabilities from a human were too slow to keep up with the ever-changing dynamics of the Wing.

I have been accused of saying the XB-49 was unstable, and to clear the record, I never, ever said the Flying Wing was unstable. I said that the aircraft was marginally stable about all three axes and could go unstable at aft center of gravity loadings. That is why I would not sign off on the Wing. The XB-49 would have to wait for technology to catch up.

In November of 1948, I briefed the leaders of the Air Force about my concerns and evaluations of the XB-49. Jack Northrop was in the audience

Behold the future! General Cardenas takes off in the XB-49 as he begins his climbout to conduct test trials with the Flying Wing. (Photo courtesy of James P. Busha)





General Cardenas begins his climb out over the U.S. Capital building in Washington, D.C. after showing off the XB-49 for President Truman. (Photo courtesy of James P. Busha)

and he supported my thoughts and findings. After I spoke, Mr. Northrop stood and addressed the generals and said, "I have the highest regard for Major Cardenas and his abilities as a test pilot. Obviously I have not been kept informed," as he turned and looked at the people he brought with him. "It looks like Northrop has a lot of work to do." The briefing ended and with it so did the Flying Wing program. But it was still far from my last flight in the XB-49.

Public Relations and Pilot Problems

On February 9th, 1949, I was ordered to fly the XB-49 to Andrews AFB in Washington, D.C. for President Truman's air power demonstration. We left Muroc and flew nonstop to Andrews in four hours and five minutes, setting a new transcontinental speed record. President Truman came out and inspected the Wing and even climbed in the cockpit. While I was showing him the interior, he turned to me and said, "Looks pretty good to me son, I think I'm going to buy some!" I bit my tongue and smiled at the President, never saying a word.

Back on the ground, Truman said to General

Hoyt Vandenberg, the chief of the Air Force, "Why don't you have this young whipper snapper fly this down Pennsylvania Avenue at rooftop level? I want the people to see what I'm going to buy!"

I knew my boss was never going to order that, especially flying a huge experimental aircraft at rooftop level over the heart of D.C. Well he did, and I did, and I never really realized how heavily forested the city of Washington, D.C. was. I lost track of Pennsylvania Avenue as I dodged some radio towers along the way. It was very hard to see straight ahead with all the trees while roaring over the city low level. Toward the end of my flight I thought I was in the clear; that was until the big white dome of the Capitol Building filled my canopy and I pulled up to avoid smashing into it! I was never so glad to leave Washington, but my troubles with the Wing only continued.

My boss was never going to order me to fly a huge experimental aircraft at roof top level over the heart of D.C. Well he did, and I did.

On the flight back to Muroc, over the Rocky Mountains, six of the eight engines caught on fire from oil starvation. I was forced to land on a small runway in Winslow, Arizona, and I landed the Wing on the first three feet and stopped on the last five feet. To make matters worse, the width of the main landing gear left me only four feet on each side of the runway. I could not turn the XB-49 and had to be towed back to the end of the runway by a big lumber mill Caterpillar. Northrop came out and changed the engines and we flew it home without further incident. On March 7th, 1949, I flew my last stability and control flight in the "Big Lady"—all lift and no drag!

I was done with the XB-49 program as far as I was concerned, but the Air Force wasn't. General Boyd sent Major Russ Schlee out to "spot check" some of the data flight info Glenn and I had gathered. Russ was a good pilot and flew three flights in the Wing. He not only confirmed our data points but also concurred with us our thoughts of the XB-49. On a later flight attempt, the nose gear collapsed on the lake bed, destroying the last of the test aircraft and almost killing Russ in the process. That ended the program and from there I faded off into the ozone! †

Robert Cardenas later became a brigadier general. He saw Muroc AFB become Edwards AFB, named after his good friend. He also watched technology catch up to Jack Northrop's original design and witnessed firsthand the development of what he calls the "finest weapons system in the world"—the B-2 Bomber.

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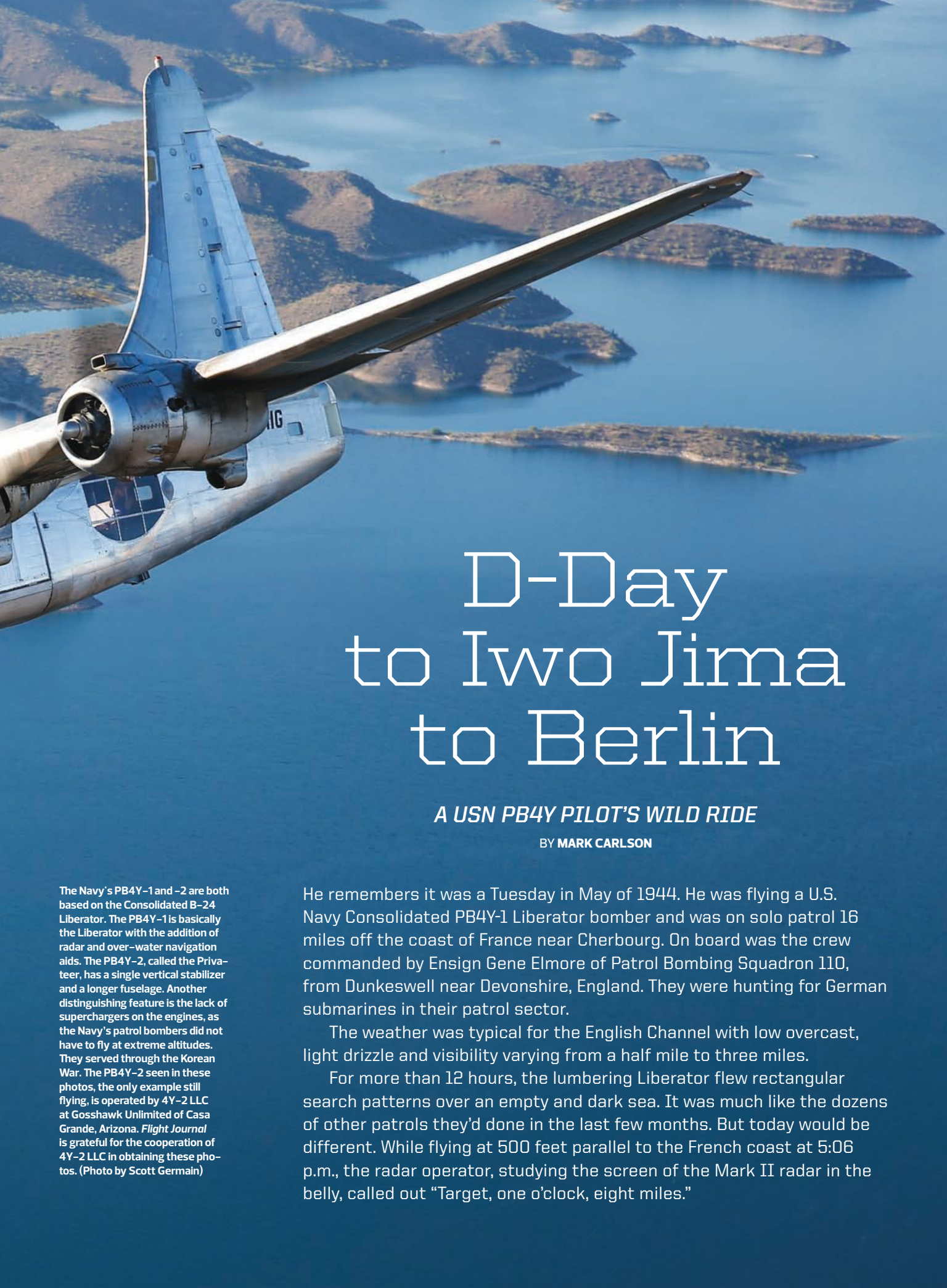
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D-Day to Iwo Jima to Berlin

A USN PB4Y PILOT'S WILD RIDE

BY MARK CARLSON

The Navy's PB4Y-1 and -2 are both based on the Consolidated B-24 Liberator. The PB4Y-1 is basically the Liberator with the addition of radar and over-water navigation aids. The PB4Y-2, called the Privateer, has a single vertical stabilizer and a longer fuselage. Another distinguishing feature is the lack of superchargers on the engines, as the Navy's patrol bombers did not have to fly at extreme altitudes. They served through the Korean War. The PB4Y-2 seen in these photos, the only example still flying, is operated by 4Y-2 LLC at Gosshawk Unlimited of Casa Grande, Arizona. *Flight Journal* is grateful for the cooperation of 4Y-2 LLC in obtaining these photos. (Photo by Scott Germain)

He remembers it was a Tuesday in May of 1944. He was flying a U.S. Navy Consolidated PB4Y-1 Liberator bomber and was on solo patrol 16 miles off the coast of France near Cherbourg. On board was the crew commanded by Ensign Gene Elmore of Patrol Bombing Squadron 110, from Dunkeswell near Devonshire, England. They were hunting for German submarines in their patrol sector.

The weather was typical for the English Channel with low overcast, light drizzle and visibility varying from a half mile to three miles.

For more than 12 hours, the lumbering Liberator flew rectangular search patterns over an empty and dark sea. It was much like the dozens of other patrols they'd done in the last few months. But today would be different. While flying at 500 feet parallel to the French coast at 5:06 p.m., the radar operator, studying the screen of the Mark II radar in the belly, called out "Target, one o'clock, eight miles."

U-boat Killers

The crew suddenly felt alert, even though they really didn't think it would be anything but a school of porpoises. But they had been drilled time and time again: "Always assume it's the enemy." Elmore banked 10 degrees to starboard and lowered the nose. They were down to 50 feet. "Target ahead, five miles," the radar operator said.



Gene Elmore with his PB4Y-1 crew in Europe. (Photo courtesy of Mark Carlson)

Elmore reached down to the bomb bay door controls. The huge doors cranked up the side of the fuselage, revealing eight 500 lb. depth charges.

"Target, three miles."

Then, they saw it through the low haze. It was a U-boat, on the surface with three men on deck, a perfect beam shot. Elmore hit the switch to arm four depth charges just as the tiny figures on the submarine saw the huge

oncoming bomber. "Tail gunner, grab the K20 camera, we're going to attack," he directed.

He lined up on the sub's conning tower and triggered the depth charge release. They fell free 50 feet apart, set to detonate 20 feet below the surface.

For the next few seconds, all Elmore and his crew heard was the roar of the four Pratt & Whitney engines. Then, the tail gunner reported seeing four huge plumes of water as the charges exploded one after the other. The third one struck next to the U-boat's hull. "We got him," he said.

Elmore made a tight 270-degree turn. Looking out the side window, he saw only the conning tower of the submarine, surrounded by roiled white water. Then it was gone. After circling to look for survivors, the Liberator turned back to Dunkeswell, England.

Elmore's crew officially claimed that they sank a German U-boat just three weeks before the Allies invaded Normandy.

Big Airplanes

Born on the last day of 1923 in Danville, Indiana, Gene Elmore was the son of a dairy supervisor father and schoolteacher mother. At the age of 12, he rode his bicycle to the local airport and gazed in wonder at the airplanes. One of them was a Douglas DC-3. The pilot, wearing a neat uniform with gold braid and wings, spotted the young boy and said, "I'll take you aboard."

Elmore's eyes were wide as he walked up the central aisle to the cockpit. "All those levers, switches and gauges, more than I ever imagined."

The memory of that huge aircraft never left

the young Elmore. After Pearl Harbor, he was eager to get into the action. Elmore joined the Naval Aviation Cadet Program after graduating from high school in January 1942. He reported to Monterey, California for ground school and Norman, Oklahoma for primary flight training in the N2S Stearman.

"We learned formation flying in the Vultee SNV Valiant, which we called the 'Vibrator,'" said Elmore. The cadets learned how to get out of a sinking plane in the device known euphemistically as the "Dilbert Dunker," a cockpit mockup set on inclined rails over a large swimming pool. The young cadet did well and moved on to multi-engine training. Ever since seeing that DC-3, he had wanted to "fly the big stuff," as he put it. He got his wish and was trained on the Consolidated PB5Y-5 Catalina patrol plane. Ensign Gene Elmore received his gold wings on April 1st, 1943 and was sent to Jacksonville, Florida for additional PBY training.

In early summer, he and five other ensigns were ordered to New York to board a troop ship for England. Fifteen days later, they reached Liverpool and were assigned to Dunkeswell, 100 miles west of London between Taunton and Exeter. Dunkeswell was home to three patrol squadrons, VPB-105, VPB-107, and Elmore's VPB-110, each with 12 PB4Y-1 Liberators (PB4Y-2 had the single tail and were Privateers). Essentially identical to the more famous USAAF B-24, the PB4Y-1 was fitted with the ASV (Air to Surface Vessel) Mark II radar in the ball turret mount and was painted in the Navy's Atlantic blue and white scheme.

When Elmore first set eyes on the PB4Y-1, all he could say was: "Wow, that's big!"

"I walked over that airplane wingtip to wingtip, wanting to know every nut and bolt," he said. "I read the pilot's manual from cover to cover. We had three officers, a pilot, co-pilot and navigator. The six enlisted specialists, AMM (Aviation Machinist's Mate), AOM (Aviation Ordnance Mate) or ARM (Aviation Radioman's Mate), included two waist gunners, nose, tail and top turret gunners. A radar operator filled out the crew."

The Liberators' job, overseen by RAF Coastal Command, was to fly 14-hour patrols in the waters around the British Isles hunting for German subs. The PB4Ys flew around the clock, ensuring that no U-boats would be able to approach Allied shipping.

"The Channel was laid out in a series of rectangles," Elmore explained. "We would fly across the water, make a 90-degree left turn and fly the length of twice the distance we could see. If visibility was 10 miles, we flew 20 and turned back across the Channel. We flew between 14 and 16 hour patrols. "The PB4Y-1 flew like a truck, heavy on the controls and hard to fly until we mastered the art of flying with trim tabs. If the airplane was nose heavy, a little elevator tab would correct it."

England's famously fickle weather frequently made visual observation impossible, and it was only the Mark II radar that helped them find any vessels. "Most of the time, all we saw were porpoises or the occasional transport or destroyer. But never a sub." The patrol in question was different from all the others, resulting in the sinking of the submarine.

As for the submarine's identity, although it has never been verified, it may have been the U-240, a Type VIIC of 9 Flotille out of southern Norway. Under the command of Oberleutnant Günther Link, U-240 was on her first patrol when she failed to return to base on May 17th. Her patrol area would have included the southern North Sea and the English Channel. It may be that the sub needed to recharge its batteries after a long underwater run from the North Sea. As a new, inexperienced crew, they may have felt safe surfaced under low overcast. Did Elmore and his crew capitalize on the inexperience of U-240's crew and send them to the bottom? History may never know for sure.

The Allied invasion of Normandy on June 6th changed the mission for the Dunkeswell Liberators. "At 1:00 a.m. on D-Day, we were loaded with 12 500 lb. bombs. So, we bombed enemy positions

in Normandy. We flew six missions on D-Day, three supporting Utah Beach and three behind Omaha." Elmore's crew made three missions a day for the next six days and received damage from German small arms fire.

Lt. Joseph P. Kennedy Jr., eldest son of the American Ambassador and the brother of the future President of the United States, was also in VPB-110. "I was a navigator in Joe Kennedy's crew when I first arrived in Dunkeswell," said Elmore. "I flew as his copilot on at least three missions over the Channel."

Kennedy volunteered for "Aprodite" to fly a special mission on August 12th, 1944 in a specially equipped PB4Y-1 carrying 10 tons of Torpex explosive. The target was the mouth of a tunnel containing the newest German secret weapon, a supergun called the V3 at Mimoyecques, France. Kennedy and his co-pilot, Lt. Wilford Willy, were to bail out after setting the plane to be flown by radio control from another bomber, but before they were able to climb out, the Liberator exploded, killing both men instantly. The cause of the blast was never determined.

The cockpit has a "lived in" look because since being "retired" from the Navy in 1959, it has flown almost continuously as a fire bomber. It was retired from that role in 2006 when Hawkins and Powers Aviation, the legendary fire operation, closed its doors. 4Y-2, LLC purchased the airplane in 2010 and bases it at Casa Grande, Arizona. (Photo by Scott Germain)

THE PB4Y-1 FLEW LIKE A TRUCK, HEAVY ON THE CONTROLS AND HARD TO FLY UNTIL WE MASTERED THE ART OF FLYING WITH TRIM TABS





A Japanese Navy G4M Betty no. 32-222 under attack and about to be shot down by the PB4Y-1 "Porter's Posse" of VPB 106 off the coast of Biak Island on May 15th, 1944. (Photo courtesy of Jack Cook)

To the Pacific

On July 1st, Elmore and three others received orders to San Diego, California. He arrived at Camp Kearny (now Marine Corps Air Station Miramar) for his orders. While in San Diego, the pilots took delivery of their PB4Y-2 Privateers, the advanced single-tail version of the Liberator.

"The Privateer had more powerful engines, two upper turrets, and flew much smoother than the Liberator," said Elmore.

"On August 25th, my new co-pilot Ensign Roger Speck and I flew the plane to San Francisco. Two days later we took off for NAS Kaneohe Bay, Oahu. That was my first experience with long, over-water flying," he admitted.

Four days after arriving at Kaneohe, the new crew took its Privateer west to Wake Island, and on to Tinian in the Marianas. Tinian, which would soon become famous as the island where the B-29 *Enola Gay* carrying the first Atom Bomb was based,

GUNS BLAZING, WE WENT UP TO 500 FEET, DROPPED OUR LOAD AND WENT BACK DOWN TO THE DECK, STRAFING ALL THE WAY OUT TO THE WATER

had been captured from the Japanese in July. The Navy's Construction Battalions (SeaBees) worked for four months to construct four 8,500-foot runways on Tinian for the massive bomber force that was to come. "The SeaBees were building the big runways, but the only one available for us was a pitted, 3,000-foot crushed coral fighter strip. That was a very tricky landing," he said.

Elmore and Speck's crew joined VPB-81. The squadron's planes were dispersed on Tinian, Kwajalein, Eniwetok, Truk and Guam to maximize their patrol area. "There were still about 500 Japanese on the island, and we were

warned about snipers."

From the new West Field, VPB-81's Privateers were to fly 16-hour patrols over the 1,500 miles between the Marianas and Japan. "We attacked any Japanese vessel we saw." The Privateers bombed the Japanese airfields on Iwo Jima to keep the Mitsubishi A6M Zeros grounded.

"It was our job to keep the two runways on Iwo out of commission. Zeros intercepted us about 75 miles out. As soon as we picked them up visually, or on radar, we dropped to 50 feet off the water. At that altitude, they could not get under us. Our top turrets and waist guns could shoot before they could get lined up on us. We zig-zagged and came in low, only pulling up when we saw the runway. Then, guns blazing, we went up to 500 feet, dropped our load and went back down to the deck, strafing all the way out to the water."

"Damn it, we know it's not down!"

On December 6th, 1944 Elmore's plane was hit by Zeros and sustained damage to the inboard engine on the starboard side. It was streaming oil and threatened to seize. "Since that engine provided power for lowering the landing gear and flaps, and operating the brakes, we had to save it," he said. "So I feathered Number Three and increased power on Number Four, the outboard engine. We were down to 120 knots and six hours out of Tinian. It would be dark by the time we reached the base. But then Number Four's cylinder temperature approached the red line and I opened the cowl flaps to try to keep the temperature down. I didn't dare start up Number Three. My engineer told me it would run for two, three, maybe four minutes and we needed it for landing."

Ditching a Privateer at night was very dangerous. Two hours passed, and then Elmore had to lower the power on Number Four to keep it from overheating. He pushed the two port engines to maximum and dropped the altitude. They were flying at 115 knots. Elmore and Speck maintained a full left rudder to keep the lumbering bomber on course. Then, a cylinder on the port inboard engine blew and he increased power on the overworked outboard engine. "Number Two would not feather, and Roger and I could not hold course with both of us standing on full left rudder. We had a real problem. I throttled back on Number One. We were about 20 minutes out and I had to risk a start on Number Three. Roger called the West Field tower and told them about our situation, and that we had to come straight in. We were told that our approach was downwind. Roger's reply was classic. 'Believe me, that's the least of our problems.'"

A mile out at 200 feet, Elmore and Speck kept their eyes on the runways and the engine gauges. Then, the cylinder temperature on Number One shot past the red. Then the tower called the harried pilots and said, "Your landing gear is not down, repeat, your landing gear is not down!"

Speck, desperately working with Elmore to coax a few more miles from the huge plane, shouted into the radio, "Damn it! We know it's not down!"

The crippled Privateer passed over the runway threshold. Elmore explained, "Roger hit the lever and lowered the gear and gave me full flaps. Just at that moment the three green gear lights came on and we touched down to one of the smoothest landings I've ever made. There were many other times when we were shot up, but this one was the most dramatic."

Supporting the Marine landings on Iwo Jima in February 1945, Elmore and his crew watched the Marines struggling to take the black volcanic island.

"Our submarines were on station around Iwo Jima to pick up survivors from downed American planes. It was always a race for who would get there first, the Japs or our subs. We strafed Jap patrol boats racing toward one of our downed crews. They had anti-aircraft guns ashore but we approached at full throttle just off the water. At 1,000 yards with our nose and upper turrets firing at the boat, we waited until the last second, pulled up to 300 feet and dropped a 500 lb. bomb." Skip-bombing sometimes worked and sometimes not, but the detonation of a 500 lb. high explosive bomb close aboard was usually enough to deter a patrol boat from any further aggressive action.

The war ended on August 14th, 1945 after Tinian-based B-29s dropped two Atom Bombs on Japan. Elmore's crew went back to Wake Island to await orders.

"In December 1945, I received orders to take a Privateer to San Diego for release to inactive duty, along with Roger. My 22nd birthday was December 31st, and we departed Wake Island at 10:16 p.m. flying east. At midnight, it became January 1st,

1946. Then we crossed the International Date Line back into 1945. We landed at NAS Kaneohe Bay, Hawaii at 9:28 a.m., 13 hours before we left Wake. I had two birthdays and two New Years."

A Colder Kind of War: The Berlin Airlift

In 1948, the Soviet occupation of East Germany put West Berlin 100 miles inside the Soviet Zone. Three 20-mile wide air corridors were established for flights in and out of the city from the United States, Great Britain and French Zones in West Germany. That June, the Soviets outlawed all road and river traffic into the area. The people of Berlin were at the mercy of the vengeful Soviets who were determined to keep the city under total control.

President Truman ordered Air Force Major General William Turner to command an airlift via the air corridors to supply the beleaguered city with coal, food, clothing, and medical supplies. From June 1948 to September 1949, British and American airmen made thousands of round trips into and out of West Berlin. The Soviets were forced to either allow the flights or shoot them down, thereby incurring the scorn of the world.

In July, Lt. Elmore eagerly volunteered to join the airlift and received orders to report to Norfolk, Virginia to train on the Douglas R5D (C-54/DC-4) Skymaster, a four-engine transport. From there he flew the R5D to Newfoundland, then to Iceland and on to Wiesbaden in the American Sector.

Elmore began flying 10-ton loads into the city, landing at Tempelhof Airport. But as with all large-scale military efforts, this one had some teething problems. "On Friday, August 13th, I was in the pattern preparing to land in Berlin," Elmore said. "The weather was poor with rain showers and heavy clouds down to the tops of buildings. Visual flight was nearly impossible. As

PB4Y-1 BuNo no. 31948 of VB-101 at Henderson Field on Guadalcanal after returning from a bombing mission with damage from attacking Zeros. On February 14th, 1943, while bombing Japanese ships off of Bougainville, no. 31949 was attacked by Zeros and shot down with the crew lost. (Photo courtesy of Jack Cook)



I circled above the field, the C-54 ahead of me crashed and burned on the runway. I landed on the adjacent runway safely, but the one behind me blew a tire avoiding wreckage. Then, the next one ground-looped, closing the airport. General Turner realized the Templehof tower crew had lost control of the situation and ordered all the planes stacked in the pattern to return to base. That day became known as 'Black Friday.'

From then on, Instrument Flight Rules (IFR) were used, regardless of weather conditions.

"If we missed our landing for whatever reason we were to fly back. This eliminated the risk of aircraft with engine trouble on the ground causing delays. The accident rate dropped dramatically."

Flight time from Wiesbaden to Berlin was about one and a half hours. Elmore and his compatriots made two or three trips a day (or night). The approach into Templehof required all of a pilot's skill, as they had to maneuver the heavy Skymasters between high-rise apartment buildings at the end of the runway, then drop quickly to touch down. The weather in Germany could turn within hours, with takeoff in perfect weather and landings in a heavy rain squall.

Red Air Force pilots did all they could to intimidate the American and British crews. "MiG fighters flew very close by and sometimes even fired their guns near us," Elmore said. "There were more than 700 incidents with the Red Air Force.

They even used searchlights on the ground to blind pilots on the approach."

By May 1949, 829 U.S. aircraft had delivered more than 2.3 million tons of cargo in 990,000 sorties. It remains the largest single humanitarian effort in U.S. military history. Finally defeated, the Soviets lifted the blockade.

"In my 413 days in Germany I made 1,221 flights," Elmore summarizes. On September 18th, 1949, he landed in Norfolk at the controls of the same R5D he'd flown to Germany a year before.

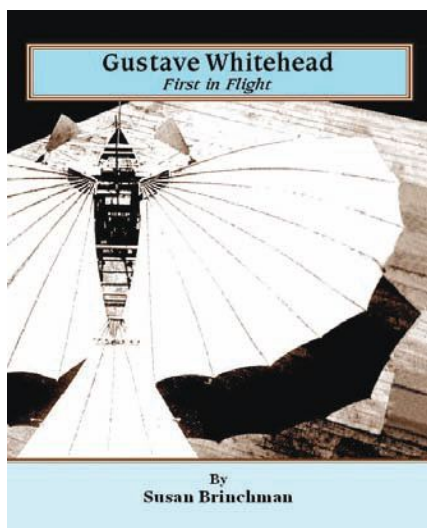
In the 1950s, Elmore trained to fly the Lockheed R7V Constellation on flights to Japan, Iran, Australia and other distant destinations. "The Connie was my favorite," he said. "It could cruise at more than 200 knots, smooth as could be."

Elmore was made a full Commander on January 1st, 1965 at NAS in Glenview, Illinois. But there were few flying billets available, and three years later he retired after 26 years—all in all, a remarkable and wide-ranging career in the sky. ✈

Below: Gene Elmore reunited with the pilot's seat and controls of a PB4Y-2 Privateer in San Diego in 2013. (Photo by Ernie Viskupic; Wingman Photography)

Inset: Shortly after being introduced to the PB4Y in 1943, Ensign Gene Elmore shows his pleasure. (Photo courtesy of Scott Germain)





Gustave Whitehead

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LIFE AMONG THE NUKES

A Cold War Warrior Remembers BY WALTER BOYNE



By sheer coincidence, I am, at 86, one of relatively few ex-SAC members who can recall both how it was in the Strategic Air Command before General Curtis LeMay's influence, and afterwards. It was a unique time in my life. In those days, the Strategic Air Command was a cocked fist carrying a knockout blow. The bellies of our fleet of 1,300 Boeing B-47s were filled with powerful nuclear weapons, and we knew our leaders had the guts to use them. The best thing was that we knew deploying the weapons was never going to be necessary because no nation dared to face the might of the United States Air Force.

When I say "we" I mean the men and women of the Strategic Air Command, then led by the greatest air combat leader of all time, General Curtis E. LeMay. It was LeMay who fashioned SAC into the perfect instrument of war.

LeMay had many irons in the fire, but two stand out. The first is the transition of the Strategic Air Command from a troubled, confused beginning to becoming the premier force in the world. The second was his mustering of support so that the American aviation industry could meet his demands.

When LeMay took over SAC in 1948, he commanded some 52,000 people, 21 bases, and 837 aircraft, including 35 each of the new Boeing B-50 and Consolidated B-36. Only seven years later, he commanded 196,000 people, 3,068 aircraft, and 51

bases, 14 of them in four overseas locations. More importantly, the aircraft LeMay possessed included 338 B-36s and 1,320 B-47s for bombing and reconnaissance, which were supported by 760 refueling aircraft, KC-97s and KB-29s. (The magnificent Boeing KC-135 would not arrive for another two years.)

Both sides perceived the threat the other represented to their national well-being, but the real threat to everyone—the entire world—came from the unprecedented and certifiably insane policies of the United States and the Soviet Union to build a vast, overwhelming number of nuclear weapons.

In some respects, the United States and its allies had no choice but to depend upon the nuclear weapon. There was no way they could match the massive Soviet Army, with its tens



The last Stratojets to serve the USAF were WB-47Es. They flew routes over the Pacific and Atlantic and across the Arctic to observe weather conditions, as well as collect atmospheric samples of nuclear testing. One of 34 B-47s modified by Lockheed Marietta, this WB-47E taking off illustrates the black smoke typically produced by water-injected B-47 departures. (Photo by Nick Williams courtesy of Habermehl Collection)



Only with an aerial view of the massive B-36 Peacemaker can the viewer appreciate the size and complexity of Consolidated's magnesium overcast that was politically chosen over the Flying Wing for mass production in the post-war period. (Photo courtesy of Stan Piet)

of thousands of tanks, with conventional weapons. It was estimated that a full-fledged Soviet attack in Europe could reach the English Channel in a matter of weeks, and then take Great Britain thereafter. Finland, Sweden and Norway would also have been overrun.

Thus began the race for nuclear armament by both sides. It reached an absurd peak when the U.S. stockpile reached 31,175 nuclear warheads in 1966, while the Soviets didn't say "when" until 1986, with 55,000 similar weapons.

Fortunately, none of this madness was unleashed, for all the world's living things might well have been destroyed.

The New Guy Arrives

As luck would have it, I reported into the 93rd Bomb Wing at Castle Air Force Base, California, early in January 1953. It was my first assignment out of flying school, and I was assigned to be a copilot in a Boeing B-50D bomber for the 330th Bomb Squadron. My first day I was completely ignored, for a B-50 from the sister 328th Bomb Squadron had just crashed, and the base was in an uproar trying to find out why.

It was my good fortune to be assigned to a great crew captained by a man who became my life-long friend, the late Colonel Chester Schmidt.

Chet was a fine pilot who had flown in combat in B-24s with the 15th Air Force, and he was considerate about treating a new copilot well in terms of sharing landings, in-flight refueling and so on. He was also generous in tolerating some shortcomings in the crew: we had a navigator/bombardier, a true gentleman who was worse than useless and whom we ignored, relying instead on the efforts of a capable radar observer, Captain Chuck Waple. Our crew chief Master Sgt. Spilecki was a very rough-hewn gem and our gunners were as good as any other crew possessed.

I was delighted to find the 93rd Bomb Wing was run like a wonderful flying club. You flew as much as 80 hours a month, but the flights were conducted "sensibly," i.e., with regard to strain on the still new Pratt & Whitney R-4360 radials of the B-50, and in general—taking it easy, helping each other out. Thus it was that our radar bombardier would guide our nav/bombardier on bomb runs for scoring, and occasionally, they would reverse rolls when the nav/bombardier had a clear sight on the target. SAC set up radar sites in various large cities, and the accuracy of the bombing could be estimated by the course and the time of bomb release when a tone was set off. If it happened that a rival crew from another unit overheard the tone going off, it was custom

to mash down on the rival's tone button for quite a while, to ensure that the dropped bomb was scored as missing the target badly.

It is pertinent to remember that most SAC crews were made up of World War II combat veterans, many of those reserve officers recalled with the advent of the Korean War in 1950. To say that they were not too happy about having their new civilian careers interrupted (one of the chaps was a veterinarian, as I recall) is no exaggeration, and they expressed it in their general contempt for their work. There was also a feeling of discontent that SAC retained most regular (i.e. career) officers for its own use and sent recalled reservists to fly B-29s in Korea. When they returned to regular SAC duty in the U.S., they were not the most dedicated of personnel. Adding to this rough and relatively temperamental mixture was the fact that we (and everybody else in the Air Force) were *profoundly* politically incorrect, especially among ourselves. Pilots were dismissive of and insulting to radar observers and navigator bombardiers, copilots were treated as "gofers" for the most part, until you proved yourself, and no one had much good to say about Army, Navy, Marine, and civil rivals, or the quality of drinks at

Most SAC crews were made up of World War II combat veterans, many of those reserve officers recalled with the advent of the Korean War in 1950

the Officers' Club.

All of this came to a shattering halt when Gen. LeMay's team arrived at the 93rd Bomb Wing. By July 1953, a new commander was appointed, a combat leader, a gentleman, and later a mean hand-ball opponent, Major General William E. Eubank, who distinguished himself in combat in the South Pacific. The SAC team systematically replaced lax squadron commanders and operations officers, installed the SAC system of training and evaluation, and turned the 93rd into an effective combat unit, newly blessed with the arrival of the sensational Boeing B-47.

Enter the B-47: a Demanding Beauty

When the first one landed at Castle Air Force Base, California, I was stunned by its beauty. It arrived just as I had passed a flight check for

The roll-out of the XB-47 on December 17th, 1947 was an amazing day, but not even Boeing would predict that more than 2,000 of the aircraft would be built. A Boeing engineer who was deeply involved in the design of the aircraft told the author that the aircraft was so radical that even he, a principal designer, had doubts as to whether it would fly or not. (Photo courtesy of USAF)





As the aircraft was modified, it just grew more beautiful. The lines of the RB-47 aircraft were more carefully streamlined. The view from the teardrop canopy was marvelous, especially when compared to refueling in the B-50 for example. (Photo courtesy of USAF)

The tail gun was remotely controlled, and the Tech Order said that the Type A-5 fire control system would automatically pick up pursuing aircraft on radar and warn the copilot. The copilot turned the seat around, selected the most important target and fired the two 20mm cannon. In practice, the system rarely worked. (Photo courtesy of USAF)

upgrade to aircraft commander in the B-50, ironically on a flight in which I delivered the 330th's last B-50D to Davis-Monthan Air Force base for storage. I didn't have enough time to qualify as copilot in the B-47, and it looked like I was slated to continue flying at "Base Operations," where I was checked out in the C-45, C-47, B-25, and T-33. (Multiple qualifications were standard—if you fought to get them. As a result, Base Operations would call at night and on weekends, begging you to take an airplane. Often you could go

anywhere you wished, just as long as you were back by Sunday night. The reason: they had to burn off their fuel allotment so that the next quarter's quota would not be cut.)

Overwhelmed by the B-47's beauty and powerful potential, I was also wracked with envy, for at that moment, there was little prospect of me flying it because of my low flying time total. Fortunately, the Squadron Adjutant was a friend. He allowed me to persuade him to send me to McConnell AFB, Wichita for B-47 crew training, without regard to my lacking about 200 hours flying time.

The schooling was hot (flying was cancelled if cockpit temperatures reached 145 degrees—this is no joke!), demanding, and well done. I was fortunate enough to be crewed up with Major Harold McCarty as aircraft commander and Captain John Rosene as radar observer. I often wonder what they thought of their low-time green-bean copilot, but they always treated me well. I am especially indebted to McCarty, who was good about letting me do refueling and make landings. It turned out that we were a good team, rapidly becoming a "Lead" crew in the 330th and on our way to becoming a "Select" crew (from which spot-promotions were made) when the B-52 appeared on the scene.

We started flying the B-47 from Castle in 1954,



Inglorious Deeds In The B-47

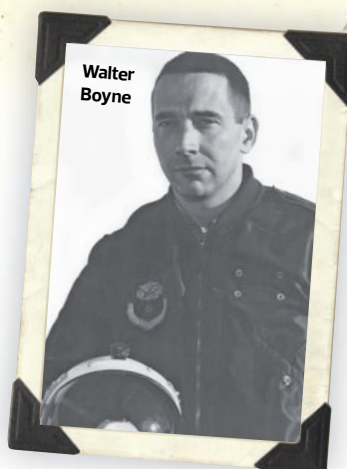
By Walter Boyne

As much as I enjoy writing about the B-47, there always lurks in the back of my mind two incidents in which I hardly distinguished myself, and for both of which I was called into the office of the Deputy Wing Commander, Colonel Patrick Fleming, previously a 19 victory Navy ace. Perhaps a short recounting of them will purge my guilty memories.

The first occurred on the start of a Unit Simulated Combat Mission, during which our first refueling was to occur at an extreme distance, where we would be down to "fumes," in the vernacular of the time.

We took off early in the morning in our beautiful B-47, but on climbout, my aircraft commander, Major Harold McCarty, noticed that the bomb bay doors did not indicate that they were completely closed. He knew at once that the increased drag from even a partially open door would preclude our reaching the tanker. The only "solution" was to descend to 18,000 feet, and have the copilot (me!) use what was called a "walk-around" oxygen bottle to go down into the bomb bay and see if the doors were actually closed or if we had an instrument error. The walk about oxygen bottle was supposed to last 10 minutes, which should have given me plenty of time.

Doing so required me to discard my parachute, climb out of



the ejection seat, switch my oxygen mask from the aircraft system and move forward in the cockpit to the entrance hatch. This was a move of roughly five feet forward, an exit through the entrance hatch, down a short ladder to a passageway of about 10 feet that led to the entrance to the bomb bay.

Fortunately, McCarty could peer down to see how I was doing, and saw that I had stopped moving. It turns out that the "10 minute" walk-around bottle was actually good for about six minutes of genuine activity. He immediately began a descent, and I came to at about 12,000 feet. Then we stooged around until we were light enough to land.

I was sent immediately to Col. Fleming's office, expecting a rocket for having blown a USCM. Instead, he treated me like a fellow pilot, took notes on the story, and actually complimented me on making the effort.

Within about six months I was back in Fleming's office, and fortunately again received the same kind of friendly treatment for a clear mistake on my part.

This time we were heading back from a mission, short on fuel, as always, and when McCarty put the "drag gear" (rear mains and tip protection gear) down to increase drag for the descent, it didn't go down.

That was another task for the copilot (me). The B-47's emergency gear extension system consisted of a rack of six huge levers placed to the right and rear of the copilot. We leveled off at a reasonable, non-hypoxic altitude at 200 knots. I expected this to be relatively quick and easy and kept my parachute on after I got out of the ejection seat, turned left, sort of squatted before the gear extension levers, and began pulling on the appropriate one. It was like pulling on a mule, the damn thing resisted my effort, pumping the gear lever back and forth. It was like some manic muscle building system, with every stroke getting harder and harder and, according to the tech order, ranging from 25 to 75 pounds of effort. Finally, however, it free fell, and after considerably more pumping, I got the green light that the gear was down and locked and could return exhausted to my seat.

I steadied myself by the seat and started to climb in when there was a sudden whoosh of air, and I realized that my parachute rigging had somehow actuated the left lever of the ejection seat. At that moment I was leaning forward over the seat, staring down at it, only too aware that if the ejection seat was malfunctioning and fired, it would carry at least the upper half of me through the canopy, leaving my legs far behind.

Fortunately, the second part of the system did not operate. I put the safety pins that disarmed the seat in place, climbed gingerly in, and we came back to land—and for another meeting with Fleming. Once again, as noted, he was completely patient and understanding, and I was among the many who deeply regretted that he lost his life in the first crash of a B-52 on February 16th, 1956.

Fleming was riding voluntarily as an observer on the night before he was supposed to depart the station for Omaha. An explosion when a high speed electrical component let go and pierced a fuel tank (a chronic flaw in the early B-52 which was subsequently corrected) sent flaming fuel into the cockpit. Fleming went out through one of the open hatches from which the pilots had ejected, but his parachute was on fire, and he was killed on impact with the ground.



The pilot is to the upper left in this shot of the B-47 cockpit. The copilot is behind him, and below his elbow are the handles for the ELGE (Emergency Landing Gear Extension) system. (Photo courtesy of Boeing/Habermehl Collection)



and by then all three of us knew that this magnificent aircraft was also magnificently dangerous. The B-47's cutting-edge design pushed the boundaries of both aerodynamics and pilot experience. Not surprisingly, this added to the pleasure of flying it for young pilots eager to enter the jet age. I, for one, felt like something I never really was: a "hot pilot." It was intoxicating to be at the controls of a B-47 at 35,000 feet, looking out

takeoff, night in-flight refueling, low level drops or anything else. There was an infectious, primal joy in flying the airplane, first as a copilot, and later as an aircraft commander, that was unlike the experience flying any other aircraft. I doubt if the fighter pilots, who at the time were being coerced into flying the B-47 felt the same, but for me, and certainly for other veterans of the B-50 and similar aircraft, it was a brave new world.

First, as a copilot, then as a pilot, you got fairly intimate with both the capabilities and the limitations of the aircraft, for you computed the weight and balance, determined the fuel load and distribution, and did the intensive pre-flight inspection. There were other tasks, more mundane, but still interesting, that included supervision of the single-point refueling system, filling the liquid oxygen reservoirs, and of course, getting the in-flight lunches. (On ultra-long missions, you sometimes got two sets of these. In-flight lunches had plenty of calories, but varied widely in quality, with the standard offering being two ham and cheese sandwiches, a carton of milk, an apple and some sort of commercial cupcake for dessert.)

As a pilot, you got to fly when the aircraft commander said you could, and this varied widely among crews. Some aircraft commanders were

The B-47's cutting edge design pushed the boundaries of both aerodynamics and pilot experience. Not surprisingly, this added to the pleasure of flying it for young pilots eager to enter the jet age.

over a blue sky in which nothing else was there to compete with you—except perhaps another B-47. Add a hell-for-leather 6,000 foot per minute descent and, if you were lucky, a "greaser" landing, and it made your day.

In retrospect, flying the B-47 could be enjoyed only by disregarding the accident statistics of the time. I never felt apprehensive about any mission, whether it was to be a heavily loaded



The General Electric J47 engines, with their rated 5,970 lb. of thrust at 100% were regarded as wonderfully modern. They were slow to accelerate and had to be treated with care, which included using a drogue chute to allow the desired rpm to be sustained. Some B-47s had internal 18-bottle Assisted Take Off (ATO) systems, while later models had a belt-on external 33-unit ATO system for added thrust on heavy-weight takeoffs. (Photo courtesy of USAF)

extremely selfish and made all of the takeoffs and landings as well as every in-flight refueling. Others understood that the poor guy in the back seat needed training too, and shared as many as possible of these duties. I was grateful and fortunate to have one of the latter type who really tried to share the duties with me. In more difficult situations—bad weather, poor communications, etc.,—Major McCarty would do the flying, but under ordinary circumstances, he saw to it that I had a chance to try everything.

The SAC Attitude

It is reasonable to state that “bitching” reached an apogee among SAC crew members, for the rigid requirements imposed by General LeMay’s standards meant almost constant vigilance. If you were fortunate enough to be granted leave for a vacation, birth of a child, movement to a new house, etc., it was almost certain to be cancelled for some “emergency.” The emergency usually turned out to be a requirement for the navigator to make another run, or the bombardier to do another series of bomb drops to bring up his average.

But the bitching was largely pro-forma, for the crews were dedicated to their mission, which was preserving the peace with the Soviet Union by intimidating it. We tend to forget just how over-

whelming the strength of the Soviet Union was in those early days. It was the intent of the Soviet Union to confer its gift of communism upon the entire world, and it refrained from doing so only because the United States possessed the nuclear power to stop it. Further, they knew we were governed by leaders who would not have hesitated to use that power.

So we in SAC crews knew that we were the first line of defense, and that our ability in executing the massive, integrated war plan of the United States was critical. For our crew in the 93rd, the war plan was strikingly similar to the one that had been created for the B-50 era. We were to take off, refuel at designated areas, and then continue into the Soviet Union to bomb Tula, then a city of about 200,000. It was important to the Soviet steel industry, as I recall. After dropping The Bomb, in the B-50 we were to do a 180-degree turn, fly until our fuel ran out, then bail out and seek out a “friendly native.” The B-47 also made a 180-degree turn, but had the range to reach Stockholm where we were to land and refuel. This was a much better option, to say the least.

The training regime for a B-47 squadron was rigorous. A mission would typically include a celestial navigation leg, two or three refueling rendezvous, and practice bomb runs at Radar Bomb



This view of the B-47 cockpit is facing forward from the aisle beside the copilot seat. The navigator's seat is barely visible in the center right, and the rudder pedal in the upper right is at the pilot's position. The white object (right center) is the toilet. (Photo courtesy of Habermehl collection)

Scoring sites in one or more cities. In rare instances, gunnery practice for the copilot was included, and if things went well, a return to shoot a few touch and go landings. Missions ran from four to as many as 24 hours, but averaged from six to eight. The radar observer conducted ECM training at various intervals, and on occasion we served as targets for interceptors. The F-86 rarely made the intercept, but the F-100 could do a roll around us when it arrived.

The Nuclear Threat In Action

On most missions, the B-47 did not carry nuclear missiles, but there were certain dedicated missions including "Unit Simulated Combat Missions" (USCM) on which bombs were carried. We believed that they were "simulated" missions, but we also knew that that mission might be changed to a real combat strike en route, and that the bomb we were carrying would be made live. In the very early days it was "made live" when the copilot inserted a large, threaded capsule

into the bomb itself, changing it from a mass of TNT and other explosives into a nuclear weapon. Later this was done electronically. The copilot was not usually informed of everything prior to a mission, this being left naturally enough to the aircraft commander and the radar observer. The copilot would have enough to do with the flight planning, which would include the all important descents to the KC-97 refueler's location and the subsequent climb back to cruise altitude. This was really annoying, for the net gain in fuel after the refueling was often relatively small. The KC-135s would eliminate this problem.

A USCM usually called for a long day's briefing with ample time for preparation, getting the right orders for in-flight lunches, visually checking fuel and liquid oxygen loads, etc. But they could also be imposed at night, when a phone call at 2:00 in the morning summoned you back for a dawn takeoff. (One of these occurred immediately after I'd gone to bed after a 24-hour mission. Needless to say there was an immediate and continuous requirement for the Dexedrine pills that were issued.)

The crews took USCMs seriously, and it is doubtful if they would be allowed in today's politically correct climate. It meant that all 45 B-47 bombers in the Bomb Wing would be refueled, loaded with genuine nuclear weapons, and take off within a very short period of time. It also meant that the same deadly serious drill was taking place at perhaps a dozen other SAC bases around the country. A deadly force of perhaps as many

as 600 or more B-47s would soon be streaking north or northeast to their refueling points and their subsequent track into the Soviet Union. It also meant that there were occasional crashes on takeoff (none of which to my knowledge resulted in a nuclear explosion) or an emergency landing by a nuclear carrying bomber at a civilian base. You can imagine what the headlines would read today if an Air Force aircraft carrying a nuclear bomb landed near Denver or Chicago. (The truth, however, is that when there were Air Defense Command fighters that carried nuclear missiles operationally, they often landed at civil airports, with no difficulties whatever.)

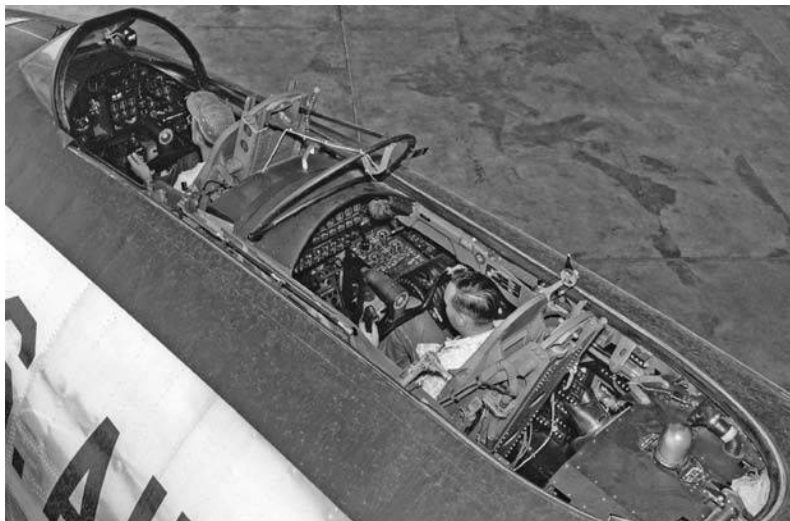
On a USCM, things usually went quite efficiently from briefing to debriefing, and there were many moments in between when the crews had time to think. I can remember distinctly the sobering thought that while our mission might be successful, we might return to find Castle Air Force Base—and our families—destroyed. We had no idea of Soviet capability, but knew for sure

With the canopy removed, one can see the relationship of the pilot stations. Behind the copilot are the controls for the 20mm tail guns. In addition to other duties, the copilot also served as gunner. To operate the guns he rotated his seat to face the rear. (Photo courtesy of Boeing/Habermehl collection)

that the Tupelov Tu-4s could get through our defenses on one-way missions, if nothing else.

This concern was minor in the early periods, however, compared to the later years when Soviet technology caught up with—and surpassed—our own with ICBMS and other similar weaponry. Then it was no longer a question of whether our home base would be destroyed or not. We knew it would. “They” had the same concerns, of course, and the same certainty. Fortunately, the Mutually Assured Destruction gamble paid off at the time. There is no guarantee that it is working today, with a probably psychopathic President Putin in charge.

But in the B-47 era, there was an élan, a confidence amounting to a surety that the Soviet Union would not dare launch an attack. We knew that we’d penetrate to our targets with minimum losses and leave behind utter destruction. Even if the Soviet Armies moved forward into Europe, our attack would have destroyed their logistics base, and their tanks would have rolled to a stop wherever they were for lack of support.



Sadly, the days of the B-47’s potency were numbered as faster fighters, better radars, and more importantly, increasingly sophisticated missiles entered the fray. Then its own dangerous track record was working against it, and General LeMay insisted upon its retirement and replacement by the workhorse Boeing B-52, which still rules the bombing roost today. ✚

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Above: The I-401 making its way along the side of its sister ship, the I-400, in Yokosuka Harbor. (Photo courtesy of EN-Archive)
 Below: This very rare photograph shows the I-400 with two Seiran Aichi M6A float planes parked on the launch rail on the front deck. (Photo courtesy of EN-Archive)



UNDERWATER AIRCRAFT CARRIERS

SNEAKING UP ON AMERICA ... AGAIN

BY DAVID TRUBY

Pearl Harbor was the first. The American West Coast was to be next for a sneak bacteriological attack. Then, bomb New York City and obliterate the Panama Canal. According to the Japanese High Command, that was all to be accomplished early in the conflict—and they were deadly serious about it. By early 1942, Japan had actually started developing the secret weapon technology required.



U.S. Navy personnel pose inside the hangar of I-401 at Pearl Harbor in 1946 shortly before the submarine was sunk to keep its technology from falling into Soviet hands. (Photo courtesy of U.S. Navy)

At the center of their follow-up sneak attacks were huge submarines known as Sen-toku, designed as the world's first (and last) undersea aircraft carriers. Key strategists, led by Admiral Isoroku Yamamoto, Commander in Chief of the Japanese Combined Fleet and a strong advocate of aviation, predicted their plan to disrupt America's ability to wage war on the Empire would be operational by year's end.

According to historian Sheena Pearson, Japan's plan was to hem in American forces and surprise-attack major U.S. cities using the huge submarines capable of carrying bomber aircraft. Pearson said, "The initial plan was for the subs to travel quiet and deep, surface, launch the swift attack on the Panama Canal, recover their aircraft, then dive and head to the next target city ... Admiral Yamamoto's initial plans had bombing attacks on

both coasts of the U.S. Their plan was to close the Panama Canal and create civilian panic in major coastal cities.”

Fortunately, as Japan’s unwinnable war bore down on them, it was a given by 1944 that the attacks would be of psychological benefit only. Part of that reasoning came about because of the death of Yamamoto the year before—an interesting aviation story of its own. Thus, when the operation launched in 1945, all submarine personnel were given tokko short swords, a gift representing the ultimate sacrifice. They were not expected to return.

Decades Ahead of Their Time

The Sen-toku I-400 class boats were easily the biggest, fastest and most technologically advanced submarines of their time, and they remained so until Soviet and American nuclear ballistic missile submarines became operational in the mid 1960s.

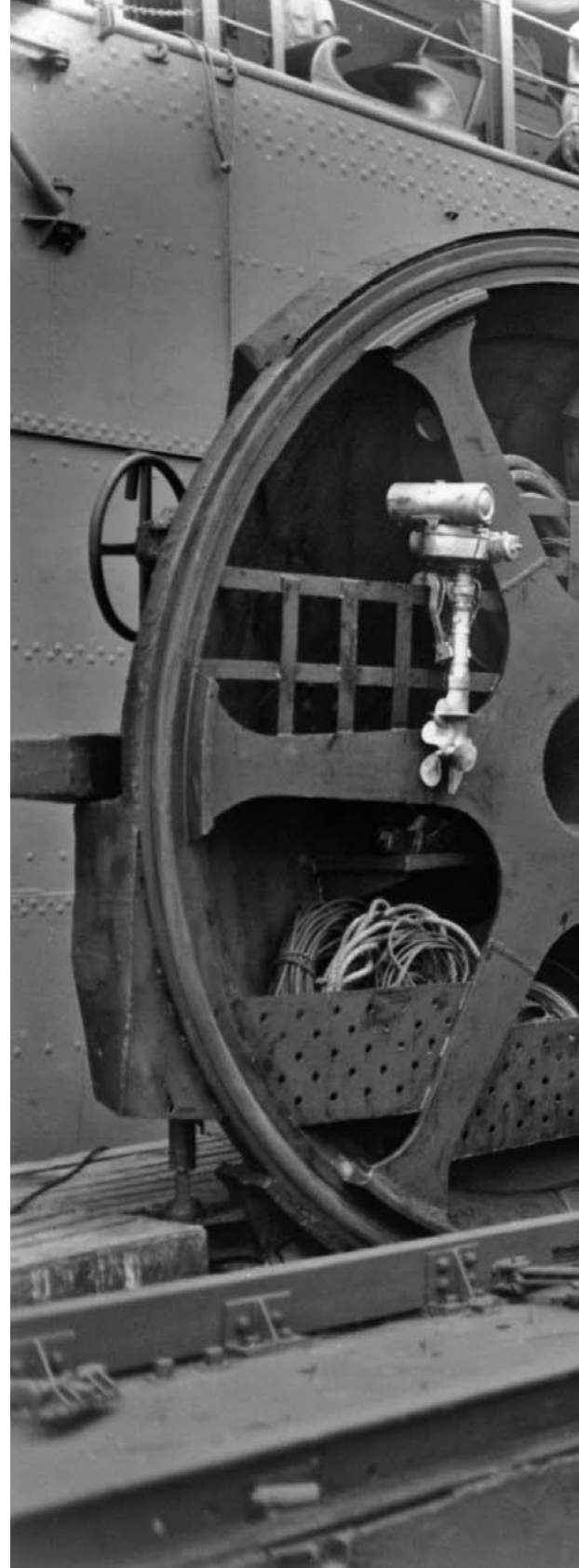
Four hundred feet long, displacing 5,900 cubic feet with a crew of 145 officers and men, it sported a rubber coating that muffled interior noise and confused enemy sonar. Each sub carried three Aichi M6A1 Seiran (“Mountain Haze”) bombers, completely unknown to Allied intelligence at the time. Each Seiran could carry a 1,764 lb. bomb/torpedo load a range of 650 miles at 295 miles per hour. A four-man crew could ready a plane for launch in less than 17 minutes inside the sub’s cavernous hull. Launch was via an 85 ft. long, compressed air catapult on the forward deck.

A FOUR-MAN CREW COULD READY A PLANE FOR LAUNCH IN LESS THAN 17 MINUTES INSIDE THE SUB’S CAVERNOUS HULL. LAUNCH WAS VIA AN 85 FT. LONG, COMPRESSED AIR CATAPULT ON THE FORWARD DECK.

The biggest risk for each sub was to get all three aircraft launched in less than 30 minutes to avoid defensive counter attacks sure to come, considering the closeness of the targets.

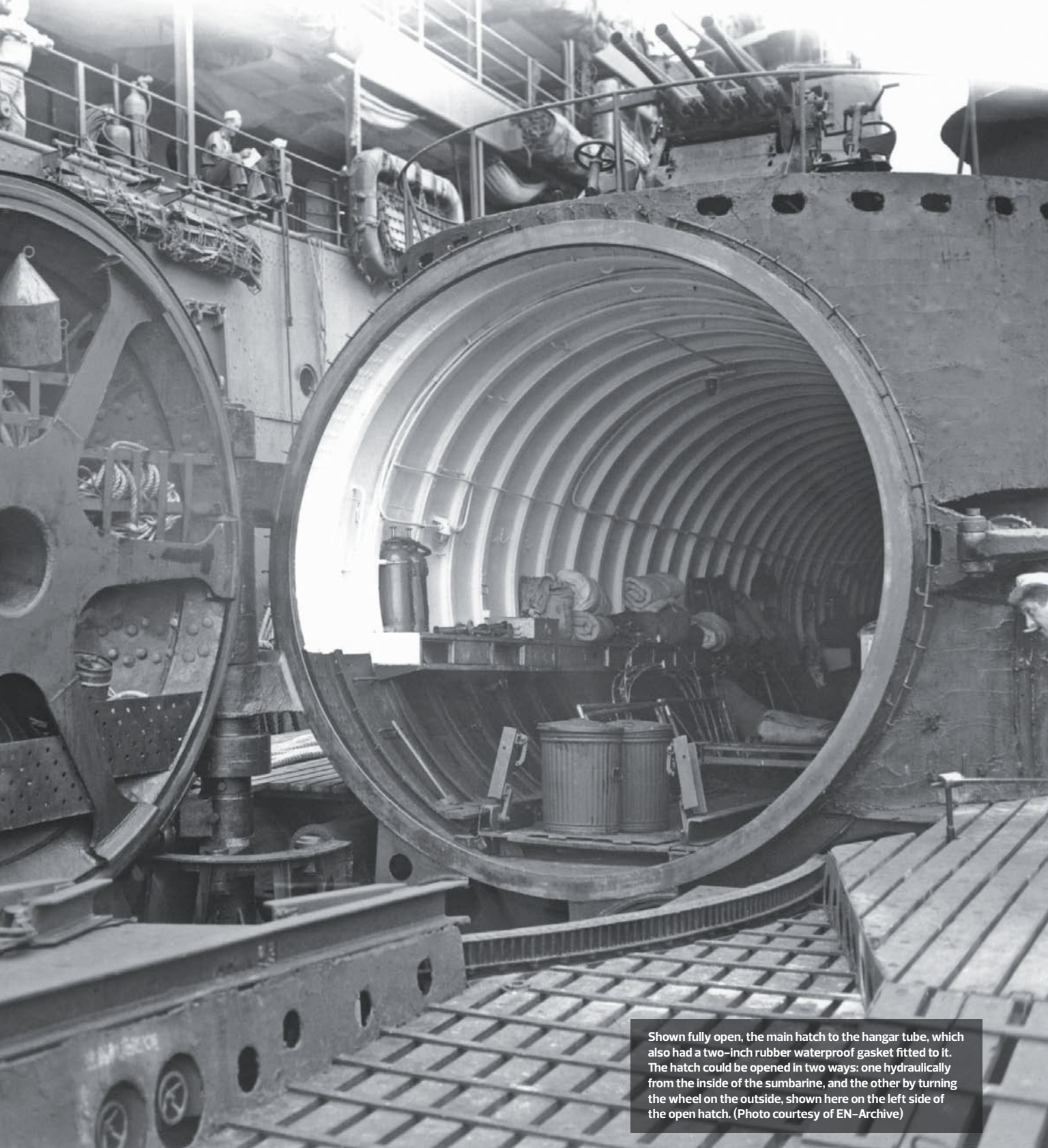
The subs were also equipped with eight forward torpedo tubes for short-range target attack, and they had huge fuel tanks that enabled them to travel 37,500 miles—an ability to circle the earth one and a half times. Historian Perry Moore wrote that these subs were “... fast, traveling at 23 knots on the surface or 10 knots submerged. They could submerge to 340 ft. and were powered by two 2400 hp engines.

“The I-400 series had great cruising range which enabled them to launch three bombers within striking distance of targets as far from Japan as San Francisco, Los Angeles, the Panama Canal, Washington, or New York. All of these missions were considered by the Tokyo Naval Strategists,” Moore wrote.



The Yamamoto Legacy: An Underwater, Aerial Threat

The brainchild of Admiral Yamamoto—conceived prior to the Pearl Harbor attack—the massive, aircraft-carrying submarines were authorized early in 1942. Yamamoto selected Captain Kameto Kuroshima as his project officer. According to project documents, the plan was for “a fleet of 18



Shown fully open, the main hatch to the hangar tube, which also had a two-inch rubber waterproof gasket fitted to it. The hatch could be opened in two ways: one hydraulically from the inside of the submarine, and the other by turning the wheel on the outside, shown here on the left side of the open hatch. (Photo courtesy of EN-Archive)

submarines each carrying three attack aircraft with grand stores of normal naval weaponry. Aerial attacks of three bombers from each vessel would destroy the Panama Canal, while bombers from other submarines would hit cities up the Southern and Eastern coast of America."

The aircraft chosen by Admiral Yamamoto was the Aichi M6A1 Seiran, an aircraft designed

specifically for aerial attacks on U.S. home targets. It was a two-seat, low-wing, high performance monoplane powered by a 1,410 hp engine. Seiran had detachable twin floats, folding/rotating wings and a folding tail assembly designed for rapid assembly and storage disassembly. Wing folding was similar to Grumman designs. The submarine also had a heater for the aircraft engine oil so



After the surrender in August 1945, the U.S. Navy used skeleton Japanese crews and USN personnel to sail the captured submarines to Tokyo for publicity purposes, then took them to Pearl Harbor for detailed inspection. (Photo courtesy of U.S. Navy)

they did not have to warm up the engine prior to takeoff.

The Seiran was powered by a liquid-cooled Asuta 30 series, 12-cylinder inverted vee, essentially a German Daimler-Benz 601A, which made for faster launch and far better pilot visibility.

With a two-man crew, each plane had the observer's cabin-mounted Type 2, belt-fed 13mm machine gun, essentially a swiped design version of the German MG 131. A total of 28 Seirans were built.

The Mission is Changed. And Changed Again.

In 1942, the Empire of Japan began construction of the massive undersea aircraft carriers. Work at the Kure naval arsenal started in 1943, but, as the war began to go badly for the Japanese, they eventually reduced the production number to five subs. Only three were ever completed. After the first mass fire bombing of Tokyo by 280 B-29s on March 10th, 1945, the Japanese devised a revised plan to retaliate by bombing San Francisco—using germ warfare—with a payload of infected rats, insects, and chemicals to spread disease. Perhaps knowing their war was already lost, the Japanese command scrapped the plan and concentrated

instead on destroying the Panama Canal gates. The commanders directed intelligence personnel in Panama to memorize vital parts of the canal's lock system.

With an Allied invasion already forming, the Japanese plan for a kamikaze attack again was redirected. The U.S. naval base on Ulithi, a Caroline island in what is now Micronesia, was bigger than Pearl Harbor and served as a major staging area during the latter part of the war. By destroying that base, they could slow the invasion. In August 1945, Operation Arashi (Mountain Storm) commenced. Two of the enormous subs, I-401 and I-400, started cruising toward Ulithi Atoll. The operation began under a full moon, with personnel receiving hormone shots to augment their night vision. The mission had a slight hiccup when one of the subs failed to receive a radio message with an updated and revised rendezvous point.

But then came the historic atomic bomb attacks on Japan that week, causing the submarine aircraft carrier mission to be figuratively torpedoed, when Emperor Hirohito announced Japan's surrender to Allied forces.

SEIRANS HAD DETACHABLE TWIN FLOATS, FOLDING/ROTATING WINGS, AND A FOLDING TAIL DESIGNED FOR RAPID ASSEMBLY



Surrender Was Hard to Fathom ... For Both Sides

The sub crews lingering around Ulithi did not believe the surrender news, even when Japanese headquarters ordered their bombing attack canceled and that the subs immediately return to Japan. The CO of the I-401, Lt. Cmdr. Nobukiyo Nambu, thought the broadcasts of August 14th and 15th were American propaganda.

But on the 15th, the submarine commanders received orders from Emperor Hirohito to cease operations immediately, destroy all weapons, aircraft, classified logs and documents, and then surrender their vessels: the war was officially over. A major reason the aircraft were to be destroyed was that they had been painted with U.S. insignia to confuse American defenders during the planned attacks. The commander of the I-400 committed suicide rather than be captured with that evidence. Within that week, the U.S. Navy took the vessels and crews into custody.

According to one source, not all of the Seiran aircraft were jettisoned by the Japanese. David Johnson, whose father was part of one U.S. Navy crew that brought the I-400 back to Hawaii, wrote that they were taken off the submarine at Barbers Point Naval Air Station, just west of Pearl Harbor.

The surviving aircraft was brought to Alameda Naval Air Station in California where it sat, nearly junked on outdoor display until 1962, when it was “rescued” by the National Air and Space Museum. The Smithsonian Institution spent several years and almost \$1 million to restore what is now the only surviving Seiran. It is on display at the NASM facility in Chantilly, Virginia.

An Ignoble End for Behemoths

The I-400s’ journey didn’t end with cessation of the war. The late Thomas O. Paine, a naval executive officer and navigator, arrived in Hawaii aboard I-400. He recounted his experience coming home in the Japanese submarine in his diary and advocated keeping the undersea carrier and its aircraft plan operational.

“To anyone who would listen I argued the case for refitting the I-400 for submerged operation and evaluation. I was convinced that we should find out how such a huge submarine handled submerged, how her automatic trim system worked, what lessons her Japanese naval constructors had incorporated into her design from their long experience with big submarines, and all of the other things I felt she could teach us. Such decisions had already slowed to a peacetime

One of two purpose-built trainer versions of the M6A1, the Nanzan variant (M6A1-K) was assembled with landing gear and a dual control cockpit. (Photo courtesy of Stan Piet)



Above: One Seiran aircraft was not scuttled following the surrender and was recovered by USN personnel. It was taken to Barbers Point Naval Air Station near Pearl Harbor in 1945 and was donated to the National Air and Space Museum in 1962. (Photo courtesy of U.S. Navy) Below: This photograph shows the restored Seiran Aichi M6A undertaken by the Smithsonian Air & Space Museum. Restoration commenced in June 1989 and was completed around February 2000. (Photo by NASM courtesy of EN-Archive)

tempo, though; we were to stand by for further orders."

Apparently, those orders did not come until the spring of 1946, when the U.S. Navy learned that the Soviets were sending an inspection team to study the gargantuan submarines. Rather than have the technology available to the soon to be rapidly-growing Soviet Union, on June 4th 1946, the submarine *USS Trumpetfish* torpedoed the two subs off the coast of Oahu.

The remains stayed hidden in that deep, dark hole until March 2005, when a research team from the University of Hawaii located I-401. Terry Kerby, the pilot of the research vessel, said, "We

thought it was giant rocks at first, it was so huge. The sides went up and up, three or four stories tall. The hull was in good shape, we could see the I-401 clearly visible and the AA guns were in good condition."

Then, in August of 2013, a joint team from the National Oceanic and Atmospheric Administration and the Hawaii Undersea Research Laboratory finally discovered I-400, also off the southwest coast of Oahu, 68 years after the USN sunk it.

No public announcement was made until December, after American and Japanese scientists, historians, and military officials reviewed and verified the findings.

Again, the project's operations officer, Terry Kerby, announced the discovery, as he had done eight years earlier, saying, "Our sonar picked up hints of a large wreck ... it was a thrill when the view of a giant submarine suddenly appeared out of the vast darkness down there. It was the I-400." The search was over and there are no plans to salvage either vessel, which closed the book, at least for the present, on the Japanese super submarine "aircraft carriers." Yet, as field researcher Jim Delgado said, "Seeing the I-400 in its grave here is like watching a shark at rest."

Lying in repose at the bottom of the Pacific Ocean, near Pearl Harbor, those giant hulks serve as a reminder of Japan's silent threat of bombing the U.S. mainland and destroying the Panama Canal via their underwater aircraft carriers. ✚





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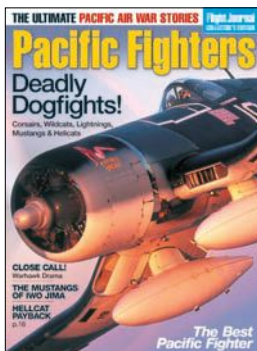
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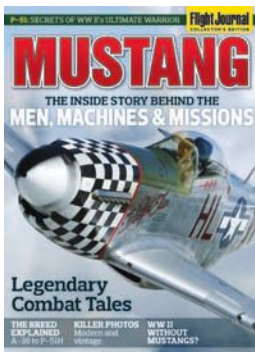
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Al Williams and the Oil Hawks

An Iconic Pilot Started with Iconic Airplanes

BY JOE GERTLER



With new sponsorship and a position as Aviation Director for Gulf Oil, Williams replaced the Bliss with a 700hp Wright Cyclone radial and enclosed cowlings and then began an exhibition campaign of NR982V as the iconic "Gulfhawk." The orange biplane remains as one of the most recognizable aircraft of the Golden Age of Aviation. (Photo courtesy of Joe Gertler)



During the between-the-wars period of frantic aviation evolution, many of the racing, exhibition, and record-setting pilots were national and international celebrities. As such, the value of their constant exposure to the public, at air shows and in the press, did not go unnoticed by the public relations and advertising executives of the major oil and gas companies.

Alford Williams and his contemporary heroes of flight were offered lucrative sponsorships for demonstrating some of the most exciting aircraft ever designed, emblazoned with company logos. Jimmy Doolittle and Jimmy Haizlip eagerly accepted positions as aviation directors of Shell Oil Co., with their sleek Lockheed Orion campaigned as "The Shelllightning." Pancho Barnes flew her famous Travel Air "Mystery Ship" and Travel Air 4000 under the sponsorship of Union Oil and Gas.

Al Williams had already achieved considerable fame and popularity as a post-WWI competitor in the Pulitzer and Schneider Trophy Races, while in some of the best Curtiss racing planes of the era. He had been the chief test pilot for the U.S. Navy, and when he left, he focused on establishing a civilian aviation career, brushing aside the potential opportunities of his law degree.

As the early models of the successful Curtiss Hawk design family were impressing the aviation community, the Hawk 1A, NR63E, began its life in 1929. An early crash resulted in the repair and re-registration as NR9E325. Another crash and rebuild later, Williams obtained the Hawk in 1930 and painted it a bright red with silver wings as NR982V and put a Bliss Jupiter radial engine in it. Sponsorship was supplied by The Standard Oil Company of Ohio (SOHIO). He performed his exhibitions in the plane known as "The EssoHawk." After yet another crash the Bliss was replaced by a 710hp Wright engine. As the press and public feasted on the exploits of the exciting plane and pilot, The Gulf Oil Company offered Williams the position of manager and exhibition pilot of their aviation department in 1933.

From that point forward the airplane achieved iconic status, and it will always be remembered as "The Gulfhawk" in its bright orange with white and blue trim. It was the most famous of the Gulfhawks, though several other incarnations followed, continuing with a line of Grumman designs.

The subsequent Grummans included the Gulfhawk II, Model G-22, which was based on a much-modified F3F. The Gulfhawk III, Model G-32, was another F3F variant. The Gulfhawk IV, Model G-58, was the much more modern and sleek Grumman Bearcat F8F.

Despite the exhibition skills, popularity, and showmanship of his contemporaries, Al Williams and The Gulfhawks remain the most recognizable and popular to this day. Most of the planes still survive. ✚



The bright red "Essohawk" NR982V with an unusual 550hp Bliss Jupiter engine was sponsored by The Standard Oil Co. of Ohio. It began as a custom version of the military Curtiss Hawk, utilizing parts from a variety of the different Hawk models. (Photo courtesy of Joe Gertler)

SAAB 37 Viggen

The Bird of Many Feathers

TEXT AND PHOTOS BY LUIGIANO CALIARO



Sweden is an aeronautically unique country. After WW II, the military realized that it needed better equipment to protect the nation, so beginning in 1946, the Air Force became one of the world's largest operators of the most state-of-the-art fighter available, the P-51 Mustang. However, while dotting over what were probably the most pristine Mustangs in existence, the Swedes started the first of many programs to develop their own jet trainers and fighters that would fit their fairly unusual needs. They are a very proud, nationalistic country and want to be self-dependent when it comes to their protection. Even their infantry rifle, the AK5, is their interpretation of the FN FNC modified to their needs and environment.

Saab (Svenska Aeroplan Aktie Bolag, Swedish Aircraft Factory) had been building aircraft since 1938, but branched out into commercial aircraft after the war and began building a successful line of automobiles. In the 1950s, the company gained experience in building a series of jet trainers and unique fighters including, the well-known, and well-respected Draken. The Saab 37 Viggen, although initially envisioned as a ground attack machine to replace the Saab Lansén, quickly took over the Draken's role as a fighter/interceptor.



Although a Mach 2.0 interceptor/ground attack machine, the SAAB Viggen has shortfield capabilities that allow it to utilize roads and highways as runways. It was taken out of service in 2005.

The country has several requirements for its aircraft that are dictated by how Swedes see combat happening in their area with its near-arctic environment. Among other things, their aircraft are usually designed to operate from specially prepared highways and roads, giving them much basing flexibility. Therefore, even though during the design phases they were talking about a Mach 2.1 fighter, that had to have extremely good slow-speed handling and landing characteristics. In fact, some sources say the Viggen can land in 4,500 feet, an unheard of number for most supersonic jets. The articulated, twin landing gear wheels are the result of wanting an aircraft that can handle uneven terrain well, and the canard helps in its slow speed regime as well as in maneuverability.

The Viggen first flew in 1967 and was put into service four years later. Production totaled 329, and it continued to serve the Swedish Air Force (no other countries operated it) until late 2005. By that time, various versions of it had been developed to better handle specific roles, including reconnaissance, air superiority, marine patrols and ground attack.

Today, only one version still flies, a 1977 AJS37. It served its entire military life at Soderhamn and, after being released to civil registry, was restored and operated by the Swedish Air Force Historic Flight—which although it appears to be a section of the Swedish Air Force, functions as a civil association developed to find, restore, and maintain military aircraft in flying condition. The Viggen was left in its natural aluminum finish, as were the initial airplanes when introduced into service. After that they wore a distinctive camouflage scheme. ✈



Only a few fighters have combined a delta wing with a canard. The airplane that replaced the Viggen, the SAAB Griphen, uses a similar layout.

Designed before glass cockpits became the standard, the Viggen still used a lot of analog steam gauges.



It's interesting to note that the leading edge of the delta wing is not a continuous straight line.



In case of a hydraulic failure, the RAT (ram air turbine) is deployed to restore power.



The canard is equipped with large movable surfaces that aid in maneuverability and slow speed control.



The tandem-wheel landing gear arrangement allows the Viggen to operate on very uneven surfaces.

Germany's V-2 Rocket

A Lethal First Step Into Space BY BARRETT TILLMAN

The German word was *Vergeltungswaffe*, which means “retribution weapon” but is normally translated as “vengeance.” Generically, the V program included a family of advanced concepts beginning with the V-1 cruise missile. The “buzz bomb” carried an 1,800 lb. warhead at around 400mph, but was susceptible to defending fighters and anti-aircraft guns. (See *Flight Journal*, June 2015.) The V-2 was unlike anything that had ever flown—it arrived by surprise and was immune to any kind of defense.

Brilliant Minds Given Destructive Goals

The V-2 program's leaders were General Walter Dornberger and Dr. Wernher von Braun. Dornberger, an artilleryman captured in WW I, saw the potential of rockets and pursued that goal from the early 1930s.

Born in 1912, von Braun was fascinated with rocketry and astronomy from childhood. He became a civilian employee of the Army Ordnance Department in 1932, and his doctoral dissertation examined the prospects of liquid-fueled rockets. He began working with then-Captain Dornberger, forming a lifelong alliance. After some success with small rockets, planning for the futuristic A-4 began in 1936.

At Peenemunde on the Baltic coast, Germany's rocket program took shape. The team produced a workable design designated the A-4, but political setbacks occurred when von Braun was arrested for declaring his main interest was space travel rather than military use. Armament Minister Albert Speer had to spring the scientist.

The Chemistry of Terror

The heart of the A-4 was its propulsion. Steam produced by a hydrogen peroxide mixture drove fuel and oxidizer pumps. The fuel, an ethanol-water mixture with liquid oxygen as an oxidizer, was forced into a combustion chamber. At temperatures approaching 5,000 degrees F, the motor produced 25 tons of thrust, boosting the V-2 higher than ever.

On ignition, the rocket had fuel for about one minute of powered flight. Then gyro-controlled pitch and steerable vanes directed the rocket until engine shutdown provided the trajectory to the intended target. A maximum apogee of 50 to 55 miles was possible.

Evaluation began in March 1942 with nearly 900 tests at at Peenemunde and two sites in Poland. At length, the A-4 reached maturity, prompting Dornberger's announcement:

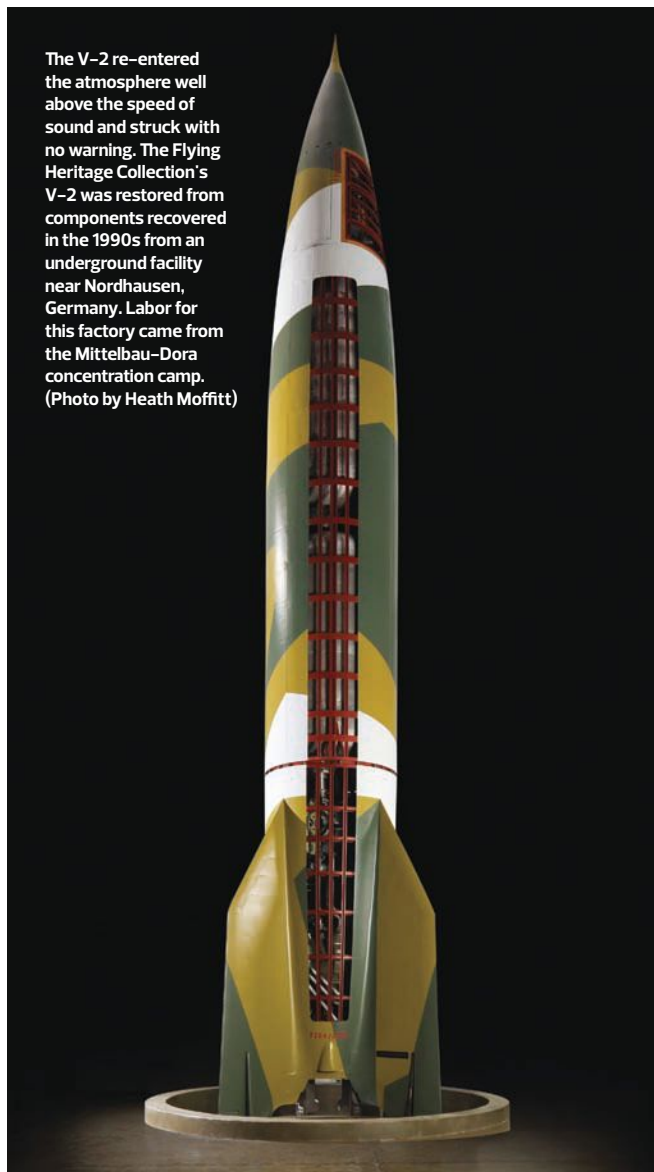
“We have invaded space with our rocket for the first time. We have used space as a bridge between two points on the earth; we have proved rocket propulsion practicable for space travel. This third day of October, 1942, is the first of a new era of transportation, that of space travel.”

Achieving operational capability, the A-4 became the V-2.

Technological Wonder With Limited Scope

Sitting on a pad, a V-2 was nearly 46 feet long with a launch

The V-2 re-entered the atmosphere well above the speed of sound and struck with no warning. The Flying Heritage Collection's V-2 was restored from components recovered in the 1990s from an underground facility near Nordhausen, Germany. Labor for this factory came from the Mittelbau-Dora concentration camp. (Photo by Heath Moffitt)



weight of 27,600 pounds. Despite its maximum velocity of 3,500mph, its effective range was only about 200 miles. Therefore, launch sites were necessarily placed in northern France and the Low Countries, but in the three months after D-Day, Germany's geographic options were limited. Fixed and mobile firing batteries supported the V-2 campaign, but both got an erratic start in September 1944. The early efforts in Belgium fizzled, but on the 8th, rockets exploded near Paris and London, inflicting damage. The RAF was quick to locate the firing batteries and attacked whenever possible, often through heavy flak.

Despite its sensational record, the V-2 remained an imprecise weapon, useful only against “area targets.” Those areas, of

course, were cities—mainly Antwerp and London. Antwerp was the primary port supporting Allied forces on the European continent, and citizens who'd lived under German rule for four years had to endure the eerie experience of a supersonic bomb that arrived soundlessly before detonation.

The warhead was typically a metric ton of amatol, a combination of TNT and ammonium nitrate. Therefore, the V-2 was a poor bargain, offering minimal bang for the buck. The tremendous engineering and production effort to place 2,200 pounds of explosive somewhere within miles of an aim point represented poor return on investment.

Nonetheless, the missile's terminal velocity was rated at some 1,700mph—over twice the speed of sound. Consequently, some London residents reported that they heard the approaching sonic boom after impact, though in most cases the noise had been lost in the explosion. Depending on the composition of the soil, a rocket's crater might measure 60 feet wide by 25 deep.

A purely ballistic trajectory was more an exercise in probability theory than mathematics. However, a radio-controlled guidance system offering improved accuracy began tests in late 1943, eventually receiving in-flight data on velocity. The equipment proved workable, but did have limited range and could be jammed by Allied "spoofers."

The High Cost of High-Tech

Being lost in the excitement of reaching space was the human cost of the V-2 program. The rockets probably killed or wounded 9,000 people in Britain and some 6,000 around Antwerp. The estimated 4,500 killed averages out to two deaths per rocket. But individual strikes could be devastating: some 850 were killed or wounded in an Antwerp theater, and 270 at a London department store.

Additionally, thousands of concentration camp prisoners died constructing rocket facilities.

Apparently, the Vengeance campaign ended in late March 1945 after some 3,100 launches: 51% against Antwerp and 42% on London. Other targets were struck in France, Holland, and Germany itself.

Dornberger, von Braun and many other German scientists and engineers were brought to the U.S. after the war, where they became integral to the space program. Some Americans questioned whether men who'd served Hitler should be granted citizenship, but supporters noted that their knowledge was unrivaled—and they could hardly have refused the Führer.

Probably more than 100 V-2s were shipped to America along with tons of engines, spare parts, and vital engineering data and drawings. From 1946 to 1952, the Americans expended more than 60 V-2s at White Sands, New Mexico, including U.S.-built "Bumper" rockets testing two-stage configurations. In 1950, the last Bumper was the first missile launched from Cape Canaveral, Florida.

The other retribution weapon was the V-3 super gun, a 150mm cannon using sophisticated sequential propulsion.



Above: An A-4 (V-2) rocket at Altenwalde near Cuxhaven, on a Meillerwagen, which was used to lift the rocket into its firing position. (Photo courtesy of EN-Archive) **Below:** The controllable fin surfaces gave the missile a degree of guidance, but it was basically ballistic in nature. (Photo by Heath Moffitt)



Two were used briefly against Luxembourg in the winter of 1944-45 with scant results.

Meanwhile, in late 1947, the Soviets fired 11 V-2s with three judged "successful." The Russians produced a V-2 clone that NATO dubbed the SS-1 Scunner. The R-11, dating from 1957, showed V-2 influence but became the separate "Scud" series of tactical ballistic missiles. The Scud D was rated at a 400 mile range.

Scuds were employed by Egypt, Afghanistan, and Iraq in the 1970s and 80s. However, the V-2's influence made headlines when Baghdad dictator Saddam Hussein launched Scuds against both Coalition targets and Israel during Operation Desert Storm. Blow-dried "war correspondents" stated that it was the first time ballistic missiles had been used against cities—a claim that residents of London and Antwerp were bound to object to. (The same "journalists" assured us that it was the first time a nation went to war over oil, though surviving members of the Japanese Imperial General Staff could have educated them otherwise.)

Whatever its origin or purpose, the V-2 remains a landmark in aerospace achievement. As with the airplane, rocketry and astronautics received a powerful boost from the impetus of world war. †



Curtiss Model 54 Tanager

A PIONEER THAT NEVER WAS BY JOE GERTLER

The Curtiss Model 54 Tanager G1 earned its spot in aviation history as the winner of the Daniel Guggenheim Safe Aircraft Competition. The Tanager name followed the Curtiss tradition of naming many of its aircraft after birds, such as Eagle, Hawk, Robin, Oriole, Thrush, Kingbird, etc.

Daniel Guggenheim controlled one of the largest family fortunes in America, with the wealth accumulating from mining ventures all around the world. After his son Harry became a pilot in WW I, Daniel became an enthusiastic supporter for the advancement of aviation technology. In 1920, he began awarding the Guggenheim Medal for Achievement in Aeronautics. He also established The Daniel Guggenheim Fund for the Promotion of Aeronautics. That fund awarded large grants to such universities as California Institute

of Technology, Harvard, Massachusetts Institute of Technology, Stanford, Georgia Tech, and many others.

During the key period in aviation evolution, Guggenheim challenged aviation designers to come up with "foolproof" designs in the Guggenheim Safe Aircraft Competition. The top award was \$100,000, and there were five additional \$10,000 awards. The aircraft entered in the contest had to meet very ambitious requirements. It had to:

- Land over a 35-foot obstacle, with a maximum roll-out of 300 feet
- Take off in 500 feet, and clear a 35-foot obstacle
- Be capable of stable and level flight at 35mph, without stalling
- And most ambitious of all, it had to fly hands-off at any speed between 45 and 100mph for five minutes in rough and gusty air

The Curtiss Tanager with Guggenheim Flight Testing Official Prof. William Brown, the Official Observer, and Lt. Stanley Umstead, the Official Test Pilot, on December 31st, 1929.
(Photo courtesy of Joe Gertler)



The competition began on April 30th, 1927, and ran until October 1st, 1929. Of the 27 aircraft registered, only 15 appeared for the challenge. After several small crashes, and most planes proving incapable of achieving all of the ambitious performance requirements, only two entrants met the final eligibility regulations. They were the Curtiss Tanager and the Handley Page Gugnunc. One of the main design features of both aircraft, which contributed greatly to high lift and low speed stability, was the use of fully slotted leading edges of the wings. This design feature had been patented by Handley Page and clearly "borrowed" by Curtiss, without HP's permission and without any royalty paid. Even some of the most nationalistic members of the Aviation Press disputed the fairness of the Tanager's win ... by *one* point, over the Gugnunc. And it should also be considered with the difference of the initial \$100,000 prize in

1927 and 1929, just after the stock market crash.

The winning Tanager employed such advancements as tip-to-tip, full-span slotted top wings, full-floating, self-adjusting ailerons, and full flaps across the bottom wings. But after the competition, the safety and performance features were not widely accepted or used by aircraft manufacturers for years to come. The Tanager never entered production.

NC181 was the only Tanager built. It was a full-sized three-place aircraft with a wingspan of 43 feet, 10 inches, and an empty weight of 1,958 lb. The six-cylinder Curtiss Challenger radial engine of 185hp powered it to a modest cruise speed of 95mph and maximum speed of only 112mph. Newspapers reported it as having overturned in Cleveland, Ohio, in July of 1930. It was reported destroyed either due to a fuel leak, or after the engine sparks set fire to landing field grass. †

Teddy's Excellent Adventure

Roosevelt Wasted No Time Being the First Prez to Fly

BY JOHN LOCKWOOD

The very name of **Theodore Roosevelt** brings up an image of a man of limitless energy, always seeking new adventures. In 1910, he added another one to his list when he flew in an airplane.

Roosevelt started life as a sickly child, but he didn't stay that way. He spent his youth training and exercising until his earlier frailty was just a memory. The one exception was his eye-

One of the aviators, Arch Hoxsey, who worked for the Wright brothers and was flying one of their biplanes, met Roosevelt on the field. Hoxsey was a great admirer of Roosevelt and was determined to give him a plane ride. Hoxsey later described their meeting in the Wednesday, October 12th issue of the *St. Louis Republic*.

Hoxsey broke the ice by mentioning that both he and Roosevelt had the same birthday, October 27th. "As soon as I saw his smile, I knew I had him." Roosevelt then expressed envy of Hoxsey's flying, leading to: "Here is your chance to share it with me," followed by a hopeful, "No?", then Hoxsey's "Sure."

As Hoxsey and Roosevelt made their way to the airplane, Hoxsey felt he was "walking on air." But he reminded himself: "Now, Hoxsey, no funny business when you get this fellow up, because if you spill him you can never square yourself with anybody."

At first, the crowd of some 15,000 spectators thought that Roosevelt was merely going to get his picture taken in the plane. But then, people began calling out such things as "Well, I'll be damned, if he isn't going up!"

Roosevelt clambered between the wires and struts and took his seat. The former President was a bit portly, so Hoxsey tied a few blocks of metal on his own side of the craft, to balance the weight.

While waiting for takeoff, Roosevelt may have been a bit apprehensive, with his jaw grimly shut as shown in newspaper photos and in eyewitness accounts. But once air-

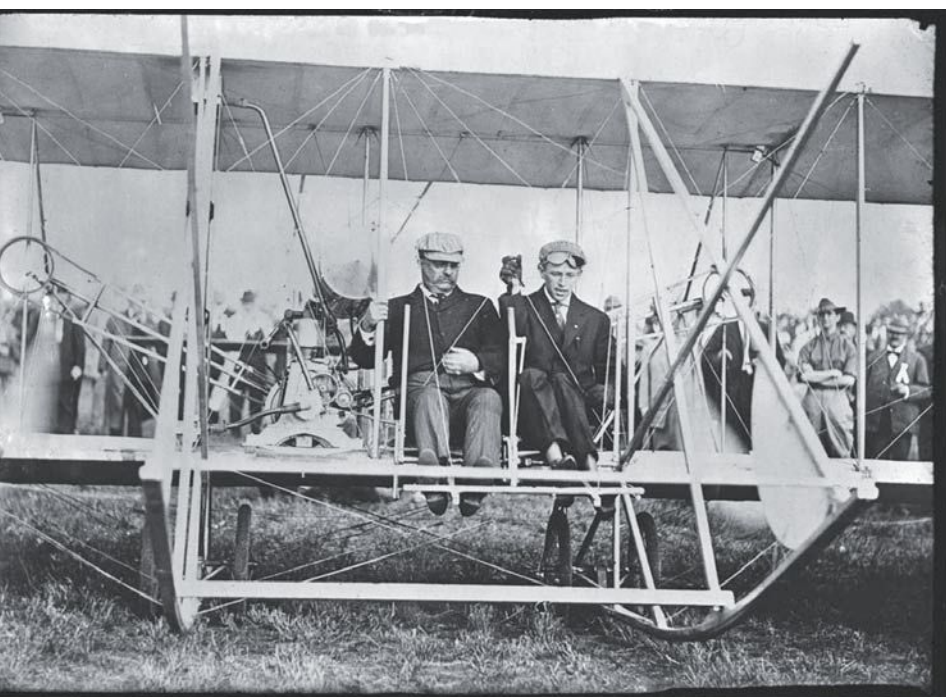
borne, Roosevelt began having the time of his life.

The flight lasted three minutes and 30 seconds, about 100 feet above the ground. Hoxsey was careful to fly only over open areas, in case he had to land suddenly. As for Roosevelt, he was waving at the crowds below, while they in turn cheered themselves hoarse. The band played "We Won't Go Home Till Morning."

However, Hoxsey had to shout to his hero over the aircraft noise, asking Roosevelt to stop the handwaving, which might disrupt one of the wires or other connections. In particular, Hoxsey was worried about a valve cord overhead, which, if pulled even slightly, would shut down the engine.

Then the plane gently landed, and Roosevelt climbed out with an ear-to-ear grin. The two men were briefly separated by the crowd, but Roosevelt called out, "Hoxsey, you're all right." For Hoxsey, "It certainly was the biggest day of my life!"

What did Roosevelt think of it all? "It was bully!" ✚



Roosevelt, looking a little anxious, prepares himself for his first flight.

sight, but his eyeglasses never held him back.

Roosevelt eventually entered public life, culminating, of course, in the presidency. Although he eventually left office, he can hardly be said to have retired. Among other things, he went on a safari and took a ride in a submarine.

Roosevelt also stayed active in politics, campaigning for the Republican Party. That brought him to St. Louis, Missouri for a one-day visit on Tuesday, October 11th, 1910, to speak on behalf of the party at the local Coliseum. An international air meet had started the day before at the Kinloch Aviation Field, and Roosevelt was determined to see that first. As he expressed it, "We wanted to cram 48 hours of experiences into 24 hours." He would arrive at the field by 3 p.m., and give his speech at 8:30.

Though Roosevelt had only left the White House the previous year, local newspapers called him "Colonel Roosevelt," or the "Colonel," referring to his service in the Spanish-American War. Nowadays, former presidents are still called "President."

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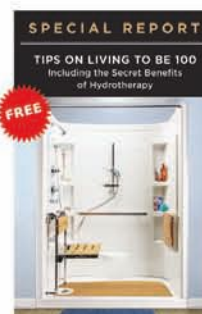
- Arthritis
- Circulation Issues
- Aches and pains
- Neuropathy
- Sciatica
- Inflammation

The Jacuzzi® Hydrotherapy Shower provides a lifetime of comfort and relief... safely and affordably.

As we age, the occasional aches and pains of everyday life become less and less occasional. Most of us are bothered by sore muscles, creaky joints and general fatigue as we go through the day- and it's made worse by everything from exertion and stress to arthritis and a number of other ailments. Sure, there are pills and creams that claim to provide comfort, but there is only one 100% natural way to feel better... hydrotherapy. Now, the world leader in hydrotherapy has invented the only shower that features Jacuzzi® Jets. It's called the Jacuzzi® Hydrotherapy Shower, and it can truly change your life.

For over 50 years, the Jacuzzi® Design Engineers have worked to bring the powerful benefits of soothing hydrotherapy into millions of homes. Now, they've created a system that can fit in the space of your existing bathtub or shower and give you a lifetime of enjoyment, comfort and pain-relief. They've thought of everything. From the high-gloss acrylic surface, slip-resistant flooring, a hand-held shower wand, a comfortable and adjustable seat, to strategically-placed grab bars and lots of storage, this shower has it all.

Why wait to experience the Jacuzzi® Hydrotherapy Shower? Call now... it's the first step in getting relief from those aches and pains.



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